

## 1. Term 1

1. [Number Patterns](#)
2. [Number Patterns](#)
3. [Number Patterns](#)
4. [Number Patterns \(Mental calculations\)](#)
5. [Number Patterns \(Square numbers\)](#)
6. [Number Patterns \(Mental calculations\)](#)
7. [Number Patterns \(Terms\)](#)
8. [Number Patterns \(Fibonacci spiral\)](#)
9. [Number Patterns \(Triangular numbers\)](#)
10. [Number Patterns \(Gauss calculations\)](#)
11. [Number Patterns \(Terms\)](#)
12. [Number Patterns \(Patterns\)](#)
13. [Number Patterns \(Module test\)](#)
14. [Fun with the pocket calculator](#)
15. [Fun with the pocket calculator](#)
16. [Fun with the pocket calculator](#)
17. [Fun with the pocket calculator](#)
18. [Fun with the pocket calculator](#)
19. [Negative Numbers \(Number line\)](#)
20. [Temperatures](#)
21. [Having Fun with Pocket Calculators and Negative Numbers](#)

## 2. Term 2

1. [Rectangular and triangular numbers](#)
2. [Estimations, Equations and Variables \(Mental calculation test\)](#)
3. [Estimations, Equations and Variables \(Magic square\)](#)
4. [Estimations, Equations and Variables \(Algebraic equations\)](#)

5. [Estimations, Equations and Variables \(Algebraic equations\)](#)
6. [Fractions - 01](#)
7. [Fractions - 02](#)
8. [Fractions - 03](#)
9. [Fractions - 04](#)
10. [Fractions - 05](#)
11. [Fractions - 06](#)
12. [Fractions - 07](#)
13. [Fractions - 09](#)
14. [Fractions - 09](#)
3. Term 3
  1. [Decimal fractions](#)
  2. [Logical sequence and comparison of decimal fractions](#)
  3. [Decimal fractions and rounding off](#)
  4. [More revision](#)
  5. [Adding and subtracting of decimal fractions](#)
  6. [Multiplication of decimal fractions](#)
  7. [Division by multiples of 10](#)
  8. [“Noughts and Crosses” and Module Test](#)
  9. [How to calculate a percentage of an amount](#)
  10. [Percentages – discount and increases](#)
  11. [Profit and lost](#)
  12. [Pie Graph with Percentage](#)
  13. [Research Task and Module Test](#)
  14. [Geometry](#)
  15. [Angels](#)
  16. [Self-assessment](#)
  17. [Polygons](#)
  18. [Triangles](#)
  19. [Symmetry](#)
  20. [Tesselations](#)

## 21. MODULE TEST

### 4. Term 4

1. Revising
2. Perimeter
3. Area
4. Area (Brain-teaser)
5. Area of irregular figures
6. Three dimensional objects
7. Nets
8. Volume
9. Volume and capacity
10. Revising
11. Compare sizes
12. Symmetry and rotation
13. Transformations
14. Data and statistics
15. Modes, medians and arithmetic mean
16. Methods to gather information
17. Ways in which to represent data
18. Own representation of data
19. Another type of data
20. Probability

Number Patterns

MATHEMATICS

Number Patterns

EDUCATOR SECTION

Memorandum

1. NUMBER PATTERNS

Learner Section

Content

ACTIVITY: Number Patterns [LO 1.9.2]

1. Welcome to Grade 7.

If you are able to decipher the following code with the help of your pocket calculator, you will realise what this first module is about! Colour in those blocks that contain the correct answers:

B12	W222	H61	S34	L826	O567	R8	M17	D468	Y2
E4136	I2148	A3156	A16	K900	P356	D6	F14	M23	A8
G10	R4168	T259	Y810	W460	K1	A193	N13	O17	P7
N4002	U1623	M467	B88	E1323	R510	A15	T6247	T463	E7
G1620	A911	F406	T1299	R1707	E968	K1810	B884	R5104	Z17
O1723	P5	A9	T624	T25	E41	R3	N56	S44	O5
K1829	K66	O753	S1817	I438	E1841	N19	T741	B1714	O3
D712	E959	L1709	E786	R35	S1448	O702	M4674	P1801	L9

CLUES:

1. \_\_\_\_\_ ÷ 87 = 46
2. \_\_\_\_\_ × 3 = 4 869

$$3.2\,335 \div \underline{\hspace{2cm}} = 5$$

$$4.1\,056 \div 12$$

5.  $49 \times 27$

6.  $17 \times 30$

$$7. 635 \div 127$$

$$8.1\,323 \div 147$$

$$9.26 \times 24$$

$$10.2 \text{ } 175 \div 87$$

11.  $39 \times \underline{\hspace{2cm}} = 1\,599$

12.  $210 \div 70$

13.  $42 \times \underline{\hspace{2cm}} = 2352$

14.  $132 \div 3$

Write you answer here: \_\_\_\_\_

---

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.9:** We know this when the learner uses a range of techniques to perform calculations including:

**1.9.2:** using a calculator.

Number Patterns

## **MATHEMATICS**

### **Number Patterns**

#### **EDUCATOR SECTION**

##### **Memorandum**

3

a 135; 405; 1 215; 3 645

b. 120; 720; 5 040; 40 320

c. 72; 56; 42; 30

d. 4 374; 1 458; 486; 162

e.

f.

g. 20; 10; 5; 2.5

##### **Leaner Section**

##### **Content**

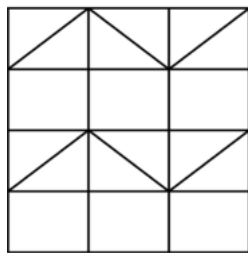
##### **ACTIVITY: Number Patterns [LO 2.1]**

2. Did you know?

Number patterns are also called **SERIES**. If you look around carefully, you will see patterns everywhere: on your clothes, in your house, on pieces of jewellery. You can also see patterns in nature, e.g. a spider's web, seashells or inside flowers. Even music has number patterns! (The pattern is in the length of the notes.)

a. Page through a magazine to look for examples and paste pictures of the things that have been discussed in this space.

b. Design your own pattern for kitchen floor tiles. For example:



3. Work with a friend and see if you can complete the following number patterns:

a) 5 ; 15 ; 45 ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_

b) 1 ; 2 ; 6 ; 24 ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_

c) \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; 20 ; 12 ; 6 ; 2

d) \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; 54 ; 18 ; 6 ; 2

e) - ; - ; - ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_

(f) \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; - ; - ; -

(g) 160 ; 80 ; 40 ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_ ; \_\_\_\_\_

## **Assessment**

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns.



## Number Patterns

# MATHEMATICS

## Number Patterns

## EDUCATOR SECTION

### Memorandum

### Leaner Section

### Content

#### ACTIVITY: Number Patterns [LO 2.1]

4. A set of numbers that is obtained by following a rule (such as the above example ) is called a NUMBER SEQUENCE or NUMBER PATTERN.

5. Create your own number pattern.

- Choose any number less than 10. Write it down
- Multiply this number by 4 and add 3 to it. This will be the next number in your series . Write it down.
- Multiply the new number by 4 and add 3 to it. Write this number down also.
- Continue doing this until the first seven numbers of your series have been determined.

Write your completed series  
here\_\_\_\_\_

- Ask a friend to check if you have calculated your series correctly.

6. Quickly write down the following:

a. Your home telephone number:

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b. Your identity number

:

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c. Your mother or father's cell phone number:

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d. Your school's telephone number:

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- Do you recognise any patterns that make the numbers easier to memorise?

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- If so, what is the pattern?

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## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns.

Number Patterns (Mental calculations)

## **MATHEMATICS**

### **Number Patterns**

#### **EDUCATOR SECTION**

##### **Memorandum**

7.

a) 96

b) 61

c) 53

d) 13

e) 12

f) 54

g) 82

h) 24

i) 80

j) 178

k) 2 700

l) R90

m) R60,80

n) 24 000

o) 90

p) R237

q)

r)

s)

t) 34.25

- increases with one (+1)
- increases with 7 (+7)
- increases with 8 (+8)

8.4 increases with 6 (+6)

- 6; 27; 48
- 24; 27; 30

The total is different

- 27; 27

8.5.4 The total is the same

it is the same as above

## **LEANER SECTION**

### **Content**

#### **ACTIVITY 1: Number Patterns (Mental calculations) [LO 2.2]**

- Let us see how you cope with the following mental calculations. Try and complete the test in less than two minutes.

a)  $12 \times 8 =$  \_\_\_\_\_

b)  $23 + 38 =$  \_\_\_\_\_

c)  $48 +$  \_\_\_\_\_  $= 61$

d)  $132 \div$  \_\_\_\_\_  $= 11$

e)  $71 - 18 =$  \_\_\_\_\_

f) \_\_\_\_\_  $\div 6 = 9$

g)  $63 + 19 =$  \_\_\_\_\_

h)  $39 + .$  \_\_\_\_\_  $= 63$

i)  $7 \times$  \_\_\_\_\_  $= 560$

j) Double 89: \_\_\_\_\_

k)  $90 \times 30 =$  \_\_\_\_\_

l)  $R4,50 \times 20 =$  \_\_\_\_\_

m)  $400 \times 60 =$  \_\_\_\_\_

n)  $2\ 700 \div .$  \_\_\_\_\_  $= 30$

o)  $R6,08 \times 10 =$  \_\_\_\_\_

p)  $R2,37 \times 100 =$  \_\_\_\_\_

q)  $3/8$  of 64 = \_\_\_\_\_

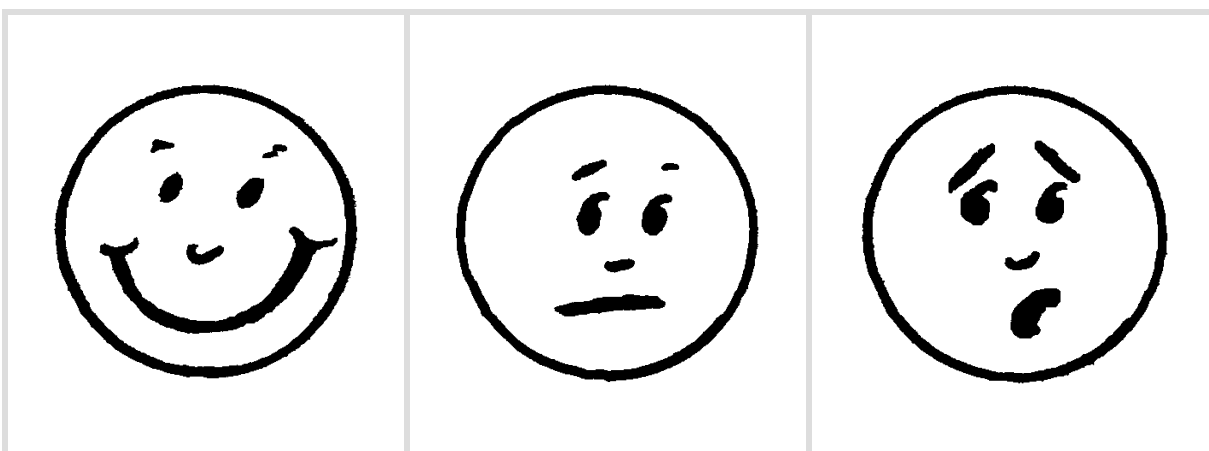
r)  $4/5$  of 45 = \_\_\_\_\_

s)  $6/7$  of 42 = \_\_\_\_\_

t) Halve 68,5: \_\_\_\_\_

I have . \_\_\_\_\_ . correct.

- Colour in the face that shows how you feel:



8. Look at the interesting pattern we can find on a calendar.

- Work with a friend and discuss:

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

a) What pattern can you see in each row? (horizontal)

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b) What pattern can be seen in each column? (vertical)

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c) What patterns do you see in the diagonal from left to right?

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d) What patterns do you see in the diagonal from right to left?

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e) Look at the block marked with a dark line on the calendar. Now determine:

f) The sum of each row:

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g) The sum of each column:

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- What do you notice?

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h) The sum of the diagonals:

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- What do you notice?

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i) Test now for other "blocks" of numbers on the calendar. What is your conclusion?

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## Assessment

***Learning Outcome 2:*** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.



***Assessment Standard 2.2:*** We know this when the learner describes, explains and justifies observed relationships or rules in own words.

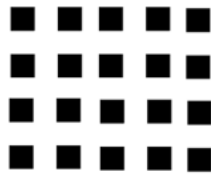
Number Patterns (Square numbers)

## **MATHEMATICS**

### **Number Patterns**

#### **EDUCATOR SECTION**

##### **Memorandum**



9.

a)

b) 16; 25

c) 64

d) 225

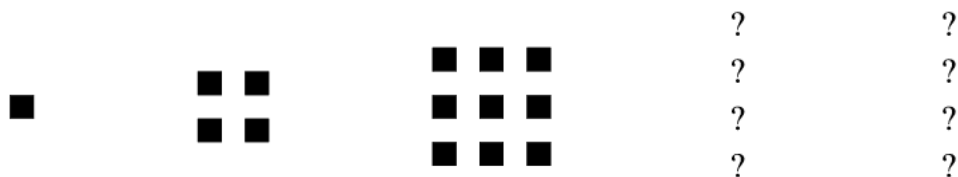
e) 2 500

##### **Learner Section**

##### **Content**

**ACTIVITY: Number Patterns (Square numbers) [LO 2.1]**

9. Study the following patterns by counting the squares:



a) Draw what ought to be in place of the question marks:

b) Complete the number row:

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c) Can you predict what the 8th number in the row will be?

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d) What will the 15th number in the number row be?

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e) What will the 50th number in the number row be?

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**10. Did you know?**

We call the above numbers SQUARE NUMBERS. .

We can also call them QUADRATE NUMBERS..

**11. Problem!**

Design your own gift wrapping. There must be a mathematical pattern visible! (Suggestion: you may use geometric shapes.)

## TIME FOR SELF-ASSESSMENT

	<ul style="list-style-type: none"> <li>• <i>Complete the following by putting a tick in the appropriate block :</i></li> </ul>	found it easy	I needed help	
	<ul style="list-style-type: none"> <li>• I can see the pattern in number sequences and can complete number patterns correctly</li> </ul>			
	<ul style="list-style-type: none"> <li>• I am able to create my own number patterns</li> </ul>			
	<ul style="list-style-type: none"> <li>• I am able to recognise interesting patterns on a calendar.</li> </ul>			
	<ul style="list-style-type: none"> <li>• I understand how square numbers work.</li> </ul>			

## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns.

Number Patterns (Mental calculations)

## **MATHEMATICS**

### **Number Patterns**

#### **EDUCATOR SECTION**

##### **Memorandum**

1.

a) Yes

b)  $25 + 26 + 27 + 28 + 29 + 30 = 31 + 32 + 33 + 34 + 35$

$36 + 37 + 38 + 39 + 40 + 41 + 42 = 43 + 44 + 45 + 46 + 47 + 48$

2.

a) 10

20

30

40

b) 120

It is actually  $10 \times 12$

3.

a) 1

11

111

b) 1 111

c) 1 111 111

## Leaner Section

### Content

#### ACTIVITY: Number Patterns (Mental calculations) [LO 2.1]

Work with a friend and see how many of the following are true (do not use a pocket calculator):

$$1 + 2 = 3$$

$$4 + 5 + 6 = 7 + 8$$

$$9 + 10 + 11 + 12 = 13 + 14 + 15$$

$$16 + 17 + 18 + 19 + 20 = 21 + 22 + 23 + 24$$

a) Are the above correct?

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b) Are you able to extend the pattern?

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2. a) Now look at the following pattern and write down the answers:

- $9 \times 1 + 1$

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- $9 \times 2 + 2$

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- $9 \times 3 + 3$

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- $9 \times 4 + 4$

---

b) Can you predict what  $9 \times 12 + 12$  will be?

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c) Explain to a friend how you arrived at the answer.

3. a) Write down the answers to the following

- $9 \times 0 + 1$

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- $9 \times 1 + 2$

---

- $9 \times 2 + 3$

---

- $9 \times 12 + 3$

---

b) Predict the answers of.

- $9 \times 123 + 4$

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- $9 \times 123456 + 7$

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c) Check your answers with the help of a pocket calculator

Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using



algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns.

Number Patterns (Terms)

## MATHEMATICS

### Number Patterns

### EDUCATOR SECTION

#### Memorandum

4.

4; 8; 12; 28; 40; 48

5. Row is faulty: must be 0; 1; 1; 2; 3; 5; 8; etc.

a)  $0 + 1 = 1$ ;  $1 + 1 = 2$ ;  $2 + 1 = 3$ ;  $3 + 2 = 5$ ;  $5 + 3 = 8$ ;  $8 + 5 = 13$ ;  $13 + 8 = 21$ ;

$21 + 13 = 34$

b) It follows the Fibonacci sequence

c) 55; 89; 144

d)  $1 - 7 - 21 - 35 - 35 - 21 - 7 - 1$

$1 - 8 - 28 - 56 - 70 - 56 - 28 - 8 - 1$

$1 - 9 - 36 - 84 - 126 - 126 - 84 - 36 - 9 - 1$

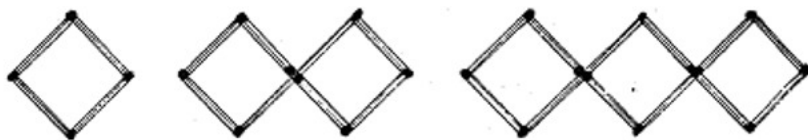
#### Leaner Section

#### Content

### ACTIVITY: Number Patterns (Terms) [LO 2.2, LO 2.3.3]

For the next activity you will need a box of matches. Place the matches as shown in the diagram.

4.



- Complete the table. If necessary, use your matches.

Number of squares	1	2	3	7	10	12
Number of matches						

#### 5. Did you know?

Leonardo Fibonacci was an Italian mathematician who lived during the 12th century. Because he lived in the town of Pisa, he was also called Leonardo of Pisa. Fibonacci looked at patterns in plants and arrived at the well-known idea of the Fibonacci sequence or series:

0 ; 1 ; 1 ; 2 ; 3 ; 5 ; 8 ; 13 ; 21 ; 34

- Take a look at the heads of sunflowers and the spirals of pine cones to see if you can observe the Fibonacci pattern.

a) Are you able to explain the pattern?

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b) Work in groups of four. Look around in the school garden (or at home) and count the petals of different flowers.

What do you observe?

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c) Add three more numbers to the Fibonacci series:

5 ; 8 ; 13 ; 21 ; 34 ;

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d) Ask your educator for graph paper and try and draw the Fibonacci spiral.

## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.2:** We know this when the learner describes, explains and justifies observed relationships or rules in own words;

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways using;

**2.3.3:** tables.

Number Patterns (Fibonacci spiral)

## **MATHEMATICS**

### **Number Patterns**

#### **EDUCATOR SECTION**

##### **Memorandum**

6.

a) 1 7 21 35 35 21 7 1

1 8 28 56 70 56 28 8 1

1 9 36 84 126 126 84 36 9 1

b).

i) Answers may differ – it depends on the row chosen

ii) The sum of the 2 numbers on top in the “triangle” is the third number below.

iii) 1; 2; 4; 8; 16; 32; 64; etc.

Answers multiply (x2)

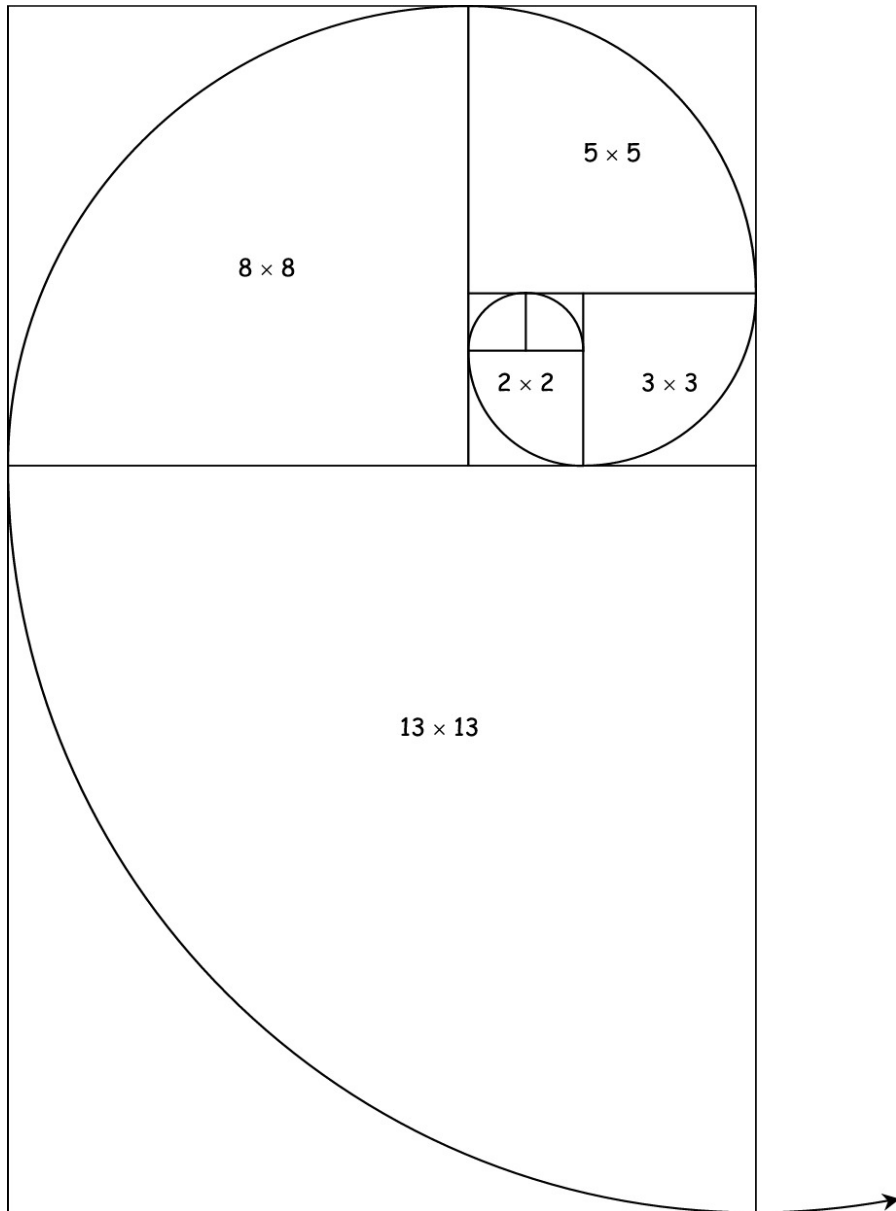
iv) 512

##### **Leaner Section**

##### **Content**

**ACTIVITY: Number Patterns (Fibonacci spiral) [LO 2.1, LO 2.2]**

**Fibonacci spiral**



#### 6. Did you know?

The French mathematician Blaise Pascal lived in the 17th century. The following interesting pattern is named after him and is called the "Pascal triangle".

						1								
--	--	--	--	--	--	---	--	--	--	--	--	--	--	--

					1		1					
				1		2		1				
			1		3		3		1			
		1		4		6		4		1		
	1		5		10		10		5		1	
1		6		15		20		15		6		1

---

a) Are you able to complete the above three rows? \_\_\_\_\_

b) Work with a friend and choose any diagonal.

(i) What pattern do you observe? \_\_\_\_\_

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ii) Explain to your friend how Pascal's triangle works.

iii) Determine the sum of each row. What pattern is formed?

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iv) What will the sum of the 10th row be?

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## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns;



**Assessment Standard 2.2:** We know this when the learner describes, explains and justifies observed relationships or rules in own words.

Number Patterns (Triangular numbers)

## MATHEMATICS

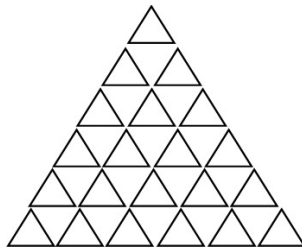
### Number Patterns

### EDUCATOR SECTION

#### Memorandum

7.

a) 1; 3; 6; 10



b).

c) Sketch 5: 15

Sketch 6: 21

$$10 \times (10 + 1) \div 2$$

$$= 55$$

$$25 \times (25 + 1) \div 2$$

$$= 325$$

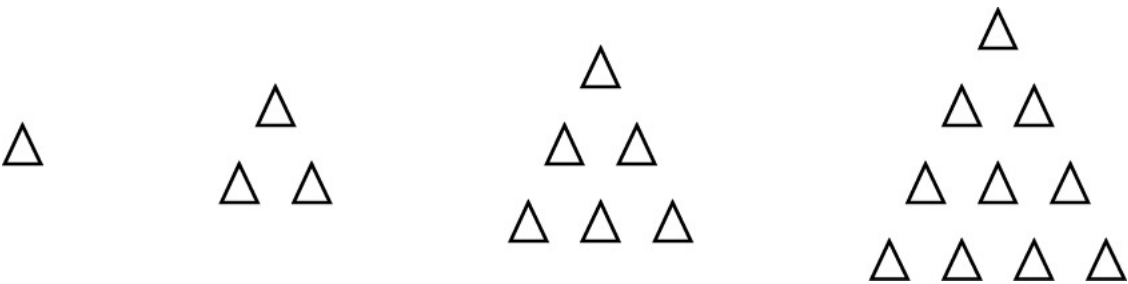
**Learner Section**

**Content**

**ACTIVITY: Number Patterns (Triangular numbers) [LO 2.3]**

7. Let us also investigate **TRIANGULAR NUMBERS**.

- Look carefully at the following



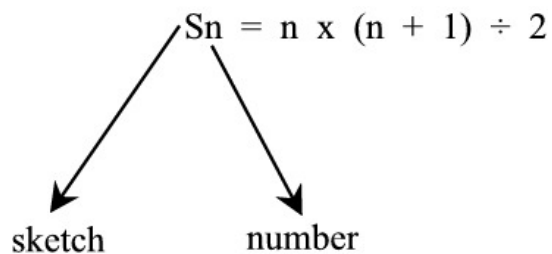
a) Now complete the following table:

Sketch	1	2	3	4		
Number of triangles						

b) Draw sketches 5 and 6 and complete the table:

c. Take note?

We can use the following formula to determine the number of triangles in each sketch:



E.g. Sketch 5 ( $S_5$ ) =  $5 \times (5 + 1) \div 2 = 15$

(i) Use the formula and determine (use your pocket calculator if necessary)

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- the 10th triangular number

- the 25th triangular number

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## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways using.

Number Patterns (Gauss calculations)

## **MATHEMATICS**

### **Number Patterns**

### **EDUCATOR SECTION**

#### **Memorandum**

8.

c) (i) 465

(ii) 1 508

b).

### **Learner Section**

#### **Content**

#### **ACTIVITY: Number Patterns (Gauss calculations) [LO 2.2]**

##### **8. Did you know?**

Karl Friedrich Gauss (1777 - 1855) was 9 years old when his educator asked him to add all the numbers from 1 to 100. He did this in record time and the method he used is now known as the "Gauss method".

a) How would YOU solve this problem?

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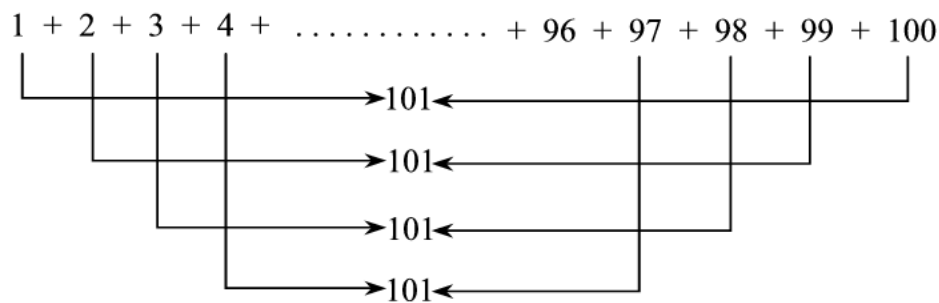
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b) Let us look at how Gauss calculated the sum!



- The sum total of each pair, e.g.  $1 + 100$  or  $3 + 98$ , is 101. There are 50 pairs in total. The sum is therefore  $50 \times 101 = 5\,050$ . Easy, isn't it?

c) Use Gauss' method to calculate:

i) the sum of the numbers from 1 to 30

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ii) the sum of the numbers from 5 to 55

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## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.2:** We know this when the learner describes, explains and justifies observed relationships or rules in own words.

Number Patterns (Terms)

## **MATHEMATICS**

### **Number Patterns**

#### **EDUCATOR SECTION**

##### **Memorandum**

##### **Learner Section**

##### **Content**

**ACTIVITY: Number Patterns (Terms) [LO 2.1, LO 2.3.1, LO 2.3.2]**

##### **9. Did you know?**

The numbers in a number sequence are also known as **TERMS**.

##### **10. Problem**

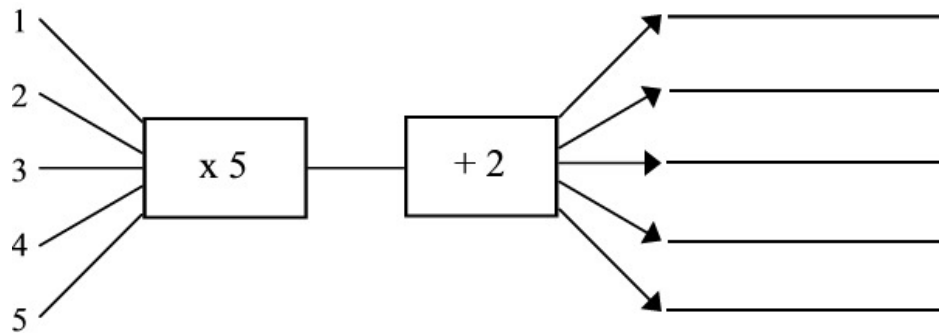
Make your own number sequence!

With a friend, work through the following example:

- Draw a flow chart with two operator blocks:
- Fill the answers in on the right.

**n- values**





Your number sequence is 7 ; 12 ; 17 ; 22 ; 27

Your rule will be:

$$T_n = (5 \times n) + 2$$

Term which

$$\text{one} = 5n + 2$$

$$\text{Thus: } T_2 = (5 \times 2) + 2 = 12$$

$$T_{12} = (5 \times 12) + 2 = 62$$

- If you are certain that you understand the above, compile your own number sequence.

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- Also compile three questions of your own and ask a friend to answer them.

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DO YOU UNDERSTAND THE PRECEDING WORK?

	<ul style="list-style-type: none"><li>• Complete the following by placing a tick in the appropriate block:</li></ul>	uncertain	reason- ably certain	very certain	
	<ul style="list-style-type: none"><li>• I can see various patterns in numbers</li></ul>				
	<ul style="list-style-type: none"><li>• I am able to predict what the subsequent pattern will be</li></ul>				
	<ul style="list-style-type: none"><li>• I can explain the Fibonacci series and complete the next sequence</li></ul>				

	<ul style="list-style-type: none"> <li>• I am able to draw the Fibonacci spiral</li> </ul>				
	<ul style="list-style-type: none"> <li>• I can explain the Pascal triangle to a friend</li> </ul>				
	<ul style="list-style-type: none"> <li>• I can determine triangular numbers by means of a formula</li> </ul>				
	<ul style="list-style-type: none"> <li>• I can determine the sum of numbers by using the Gauss method</li> </ul>				
	<ul style="list-style-type: none"> <li>• I am able to compile my own number sequences</li> </ul>				

## **Assessment**

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns.

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways using;

**2.3.1:** verbal descriptions;

**2.3.2:** flow diagrams.

Number Patterns (Patterns)

## **MATHEMATICS**

### **Number Patterns**

#### **EDUCATOR SECTION**

##### **Memorandum**

2.

a) 12 321

1 234 321

123 454 321

b) 12 345 654 321

3. a)

i) 9 109

ii) 18 218

iii) 27 327

iv) 36 436

b)

i) 633 763

ii) 81 981

4. a)

i) 111

ii) 222

iii) 333

b) Increases with 111

c)

i) 12

ii) 15

d) 888

5. a)

i) 37 037

ii) 37 037

iii) 37 037

b)

i)  $444\,444 \div 12$

ii)  $555\,555 \div 15$

6. a)

i) 111 111

ii) 222 222

iii) 333 333

b)

i) 555 555

ii) 777 777

7.

i) 1 089

ii) 2 178

iii) 3 267

iv) 4 356

b) First 2 numbers increases with one at a time.

Last 2 numbers decreases with one at a time

c)

i)  $99 \times 55 = 5\,445$

ii)  $99 \times 66 = 6\,534$

## **Leaner Section**

## **Content**

### **ACTIVITY: Number Patterns (Patterns) [LO 1.9.2]**

2. Use your pocket calculator and investigate the following patterns:

a)  $1 \times 1 = 1$

$11 \times 11 = 121$

$111 \times 111 = \underline{\hspace{2cm}}$



1 111  $\times$  1 111 = \_\_\_\_\_

11 111  $\times$  11 111 = \_\_\_\_\_

b) Now predict: 111 111  $\times$  111 111 = \_\_\_\_\_

c) Validate your answer with your pocket calculator.

**3.** Complete the following patterns:

a) i) 9 109  $\times$  1 = \_\_\_\_\_

ii) 9 109  $\times$  2 = \_\_\_\_\_

iii) 9 109  $\times$  3 = \_\_\_\_\_

iv) 9 109  $\times$  4 = \_\_\_\_\_

b) What will be the answer to:

i) 9 109  $\times$  7? \_\_\_\_\_

ii) 9 109  $\times$  9? \_\_\_\_\_

c) Now explain the pattern to a friend.

**4.** a) Here is another interesting pattern to investigate.

i) 37  $\times$  3 = \_\_\_\_\_

ii) 37  $\times$  6 = \_\_\_\_\_

iii) 37  $\times$  9 = \_\_\_\_\_

b) What have you noticed?

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c) Fill in the missing answers:

i)  $37 \times \underline{\hspace{2cm}} = 444$

ii)  $37 \times \underline{\hspace{2cm}} = 555$

d) What will the product of 37 and 24 be?  $\underline{\hspace{2cm}}$

e) Check your answer with the help of your pocket calculator.

5. a) Calculate the following:

i)  $111\ 111 \div 3 = \underline{\hspace{2cm}}$

ii)  $222\ 222 \div 6 = \underline{\hspace{2cm}}$

iii)  $333\ 333 \div 9 = . \underline{\hspace{2cm}}$

b) Write down 2 similar sums which will give the same answer.

i)  $\underline{\hspace{2cm}}$

ii)  $\underline{\hspace{2cm}}$

6. a) Also investigate the following pattern:

i)  $1 \times 15\ 873 \times 7 = \underline{\hspace{2cm}}$

ii)  $2 \times 15\ 873 \times 7 = \underline{\hspace{2cm}}$

iii)  $3 \times 15\ 873 \times 7 = \underline{\hspace{2cm}}$

b) Without using your pocket calculator, predict:

i)  $5 \times 15\ 873 \times 7 = \underline{\hspace{2cm}}$

ii)  $7 \times 15\ 873 \times 7 = \underline{\hspace{2cm}}$

7. a) With the help of your pocket calculator write down the following answers:

i)  $99 \times 11 = \underline{\hspace{2cm}}$

ii)  $99 \times 22 =$  \_\_\_\_\_

iii)  $99 \times 33 =$  \_\_\_\_\_

iv)  $99 \times 44 =$  \_\_\_\_\_

b) Examine the pattern carefully. Explain it to a friend.

c) Write down the following two sums in the series, with their answers:

i) \_\_\_\_\_  $\times$  \_\_\_\_\_ = \_\_\_\_\_

ii) \_\_\_\_\_  $\times$  \_\_\_\_\_ = \_\_\_\_\_

#### SELF-ASSESSMENT

	Complete the following by colouring the appropriate blocks:	yes	no	
	I can complete number patterns with the help of my pocket calculator			
	I can predict patterns without the help of my pocket calculator			
	I still need help to really understand this particular learning unit			

#### Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns.

Number Patterns (Module test)

## **MATHEMATICS**

### **Number Patterns**

### **EDUCATOR SECTION**

### **Memorandum**

#### TEST 1

1.

a) 0; -50

b) 1 and a quarter; 1 and a half

c) 22' 30

d) 38; 26

2.

a) number row

b) kwadraatgetalle

c) sequence

d) terms

3.

a) horizontal

b) vertical

4.

a) 13; 21

b) Fibonacci

5.

a) 2 926

b) 8

6. 10; 15

7. 7; 17; 23

## **Leaner Section**

## **Content**

### **ACTIVITY: Number Patterns (Module test) [LO 2.1, LO 2.3, LO 2.4]**

#### **8. Problem**

Work with a friend. Find the solution to the following problem by making use of number patterns

A farmer started farming with two rabbits in January. Once each pair of rabbits is two months old, they produce a new pair of rabbits monthly.

How many pairs of rabbits will the farmer have by the end of December of the same year?

(Suggestion: draw a diagram)

## MODULE TEST 1

1. Complete the following number patterns:

a) 150 ; 100 ; 50 ; \_\_\_\_\_ ; \_\_\_\_\_

b) a half ; three quarters ; one ; \_\_\_\_\_ ; \_\_\_\_\_

c) 4 ; 9 ; 15 ; \_\_\_\_\_ ; \_\_\_\_\_

d) 80 ; 65 ; 51 ; \_\_\_\_\_ ; \_\_\_\_\_ (8)

2. Fill in the missing words:

a) A set of numbers which is acquired by following a particular rule is called a  
\_\_\_\_\_

b) Square numbers are also called  
\_\_\_\_\_

c) Number patterns are also called \_\_\_\_\_

d) The numbers in a number sequence are also called  
\_\_\_\_\_ (4)

3. Underline the correct word within brackets:

a) a **sequence** is (horizontal; vertical; diagonal)

b) a **column** is (horizontal; vertical; diagonal) (1)

4. a) Complete the following pattern:

8 ; \_\_\_\_\_ ; \_\_\_\_\_ ; 34 ; 55 ; 89 (2)

b) This number sequence is known as the \_\_\_\_\_ sequence. (1)

5. Use Gauss' method to determine the sum of the natural numbers from 1 to 76.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (3)  
)

6. What is the sum of the numbers in the fourth row of Pascal's triangle?

\_\_\_\_\_ (1)

7. Complete the following triangular number pattern:

1; 3; 6; \_\_\_\_\_ ; \_\_\_\_\_ (2)

## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns;

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways using;



**Assessment Standard 2.4:** We know this when the learner constructs mathematical models that represent, describe and provide solutions to problem situations, showing responsibility toward the environment and the health of others (including problems within human rights, social, economic, cultural and environmental contexts).

Fun with the pocket calculator

## **MATHEMATICS**

### **Having Fun with Pocket Calculators and Negative Numbers**

#### **EDUCATOR SECTION**

##### **Memorandum**

5. a) 108

b) 9

c) 13

d) 68

e) 14

f) 4

g) 48

h) 72

i) 200

j) 18 000

k) 20

l) 9

m) R238

n) R6 080

o) 54

## Leaner Section

### Content

#### ACTIVITY: Fun with the pocket calculator [LO 1.9.2]

##### FUN with the POCKET CALCULATOR

1. Did you know that pocket calculators are also able to “speak”? Take your pocket calculator and key in the following:  $0,65 + 0,1234 =$

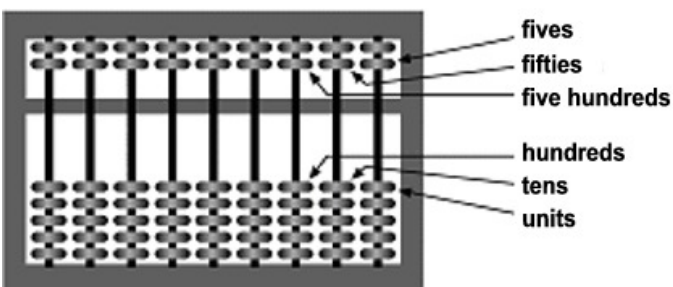
Now turn your calculator upside-down. What do you read?

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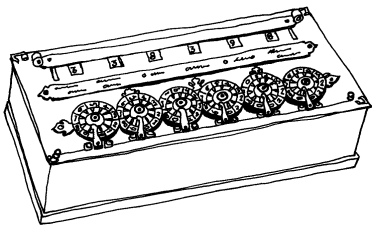
In this module we will be learning how to use the pocket calculator effectively in order to make calculating easy.

##### 2. DID YOU KNOW?

5 000 years ago the Babylonians designed a counting frame that they called an abacus. The Chinese still use a variation of this counting machine. Their abacus consists of beads that are moved along the rods of a counting frame.

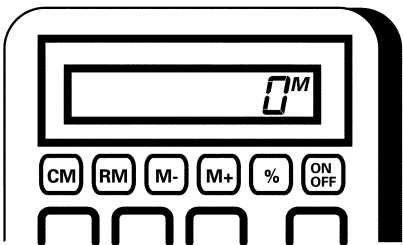


In 1642 Blaise Pascal, who lived in France, designed a counting machine that was operated by turning knobs, but it was too expensive to produce.



Charles Babbage, a British mathematician, began working on a steam-driven analytical engine in 1830. For 37 years he worked on this engine that was able to do a variety of calculations, but died before he could finalise the design.

3. LET’S DO REVISION



Work with a friend and find the following keys on your pocket calculator:

AC	=	Deletes everything, including the memory
C	=	Clears the screen
CE / CM	=	Clears the memory

Min / M / M+		_____
STO	=	Stores in the memory / adds
M-	=	Subtracts from the memory
RCL / x M		_____
MR / RM	=	Recalls the memory
<b>OM / OM</b>	=	You did not clear the memory

Does your pocket calculator have another key that must be pressed to do the above? Write it here:

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#### 4. DO YOU STILL REMEMBER?

We have pocket calculators and scientific calculators. The latter are used for more complicated calculations. Compare your pocket calculator with those of your classmates to see how they agree or differ.

5. Before we continue working with the pocket calculator, we are going to use some brainpower! Complete the following mental calculation test as quickly and accurately as possible:

a)  $12 \times 9 =$  \_\_\_\_\_

b) \_\_\_\_\_  $\times 7 = 63$

c)  $48 +$  \_\_\_\_\_  $= 61$

d) \_\_\_\_\_  $- 18 = 50$

e)  $63 -$  \_\_\_\_\_  $= 49$

f)  $(12 \times 8) +$  \_\_\_\_\_  $= 100$

g)  $8 \times 3 \times 3 =$  \_\_\_\_\_

h) \_\_\_\_\_  $\div 8 = 9$

i)  $80 \times 40 =$  \_\_\_\_\_

j)  $300 \times 60$  \_\_\_\_\_

k)  $500 \div 25 =$  \_\_\_\_\_

l) one third of 27 = \_\_\_\_\_

m)  $R2,38 \times 100 =$  \_\_\_\_\_

n)  $R6,08 \times 1\ 000 =$  \_\_\_\_\_

o) \_\_\_\_\_  $\div 6 = 9$

15

Complete by colouring in the appropriate block:

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This was	GOOD	AVERAGE	POOR	work!
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## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.9:** We know this when the learner uses a range of techniques to perform calculations including:

**1.9.2:** using a calculator.

Fun with the pocket calculator

## **MATHEMATICS**

### **Having Fun with Pocket Calculators and Negative Numbers**

#### **EDUCATOR SECTION**

##### **Memorandum**

6. a) get dressed and eat

clean different rooms in the house

order in which you do your homework

learners gives own answers

a. first draw money and then do your shopping

first learn your work and then write a test

cover books; plastic last

throw petrol in first and then ride

learners give own answers

8. a) 66

a. 0

b. 9

c. 223

d. 153

##### **Leaner Section**



## Content

### ACTIVITY: Fun with the pocket calculator [LO 1.9.2]

#### 6 SEQUENCE OF CALCULATIONS

If you do not know the sequence in which you have to do calculations, the pocket calculator will not be of any help to you - it will actually help you out of the frying pan into the fire!

Discuss the following:

- a) Does it matter if you put the milk into the teacup before pouring the tea, or the tea before the milk?
- b) Do you brush your teeth before breakfast or do you eat first and then brush your teeth?
- c) Give examples of where the sequence in which you do things does not matter.
- d) Give examples of where the sequence matters/is important.

#### 7 MORE REVISION

We work from left to right when we do repeated addition and subtraction.

e.g.  $20 - 5 + 12 - 5 - 2 = 20$

We work from left to right for repeated multiplication and division.

**e.g.  $6 \times 3 \div 2 = 9$**

In the case of mixed calculations, the sequence is:

( ) brackets
of
$\div$
$\times$
+
-

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8. Use your pocket calculator to find the answers to the following:

a)  $100 - 4 \times 5 - \text{half of } 28$

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b)  $26 \times 54 - 54 \times 26$

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c)  $200 \div 20 + 285 \div 95 - 8 + 4$

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—

d)  $382 - (129 + 31) + \text{one third of } 3$

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e)  $(65 - 15) \times 3 + 21 \div 7$

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## **Assessment**

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.9:** We know this when the learner uses a range of techniques to perform calculations including:

**1.9.2:** using a calculator.

Fun with the pocket calculator

## MATHEMATICS

### Having Fun with Pocket Calculators and Negative Numbers

#### EDUCATOR SECTION

##### Memorandum

9. a) False 18

b) False 19

c) True

d) False 13

e) True

##### Leaner Section

##### Content

##### ACTIVITY: Fun with the pocket calculator [LO 1.10]

9. Are the following **true** or **false**? If false, calculate the correct answer:

a)  $6 + 3 \times 4 = 36$

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b)  $12 \div 3 \times 4 + 3 = 4$

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c)  $(3 + 6) \times 4 + 5 = 41$

---

d)  $12 - 5 \div 5 + 2 = 1$

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e)  $8 + \text{half of } 20 = 18$

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## **Assessment**

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.10:** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

Fun with the pocket calculator

## **MATHEMATICS**

### **Having Fun with Pocket Calculators and Negative Numbers**

#### **EDUCATOR SECTION**

##### **Memorandum**

10. a)  $32 \times 64 = M+$

$$156 + MR = 2\,204$$

a.  $244 \div 61 = M+$

$$236 - MR = 232$$

11.  $-8 + (-1) + (9) = 0$

$$-3 + 6 + (8) = -5$$

$$(6) + (-1) + -4 = 1$$

13. a) 27

b) 74

c) 39

d) 15

e) 51

f) 132

g) 9

h) 102

i) 41

j) 51

k) 4

l) 1 000

m) 3 800

n) 100

o) 21

14. a) Number smaller than 0

a. Lifts; Temperature, depth under the sea

15. a) Learner gives own answer

a. -1

-3

-5

c) 3; 0; -3; -6; -9; -12; -15; -18; -21; -24

16. a) -6

b) 8

c) 13

d) -14

**Learner Section**

## Content

### ACTIVITY: Fun with the pocket calculator [LO 1.9.2]

#### 10 CHALLENGE

If you do not know the sequence in which you have to do calculations, the pocket calculator will not be of any help to you - it will actually help you out of the frying pan into the fire!

Use the memory keys on your pocket calculator to determine the correct answers. Write down what you key in:

a)  $156 + 32 \times 64$

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b)  $236 - 244 \div 61$

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## 11. BRAIN TEASER

Complete the following. Remember the correct order of operations!

- 8	+		+		= 0
+		+		+	
- 3	+	6	+		= - 5
+		+		+	
	+		+	- 4	= 1
= - 5		=		= - 3	

## 12. SELF-ASSESSMENT

Indicate which is true of you:

I can	UNSURE	FAIRLY SURE	SURE
say something about the			

history of counting machines.			
explain the function of each of the keys on my calculator.			
apply the order of operations correctly.			
use the memory keys of my pocket calculator correctly for solving problems.			

### 13. TIME FOR MENTAL CALCULATION

Complete the following as quickly and accurately as possible:

a)  $13 + 5 + 9 =$  \_\_\_\_\_

b)  $12 + 28 + 34 =$  \_\_\_\_\_

c)  $94 - 19 - 36 =$  \_\_\_\_\_

d)  $78 - 35 - 28 =$  \_\_\_\_\_

e)  $29 +$  \_\_\_\_\_  $= 80$

f) \_\_\_\_\_  $\div 12 = 11$

g)  $63 \div$  \_\_\_\_\_  $= 7$

h) one eighth of 816 = \_\_\_\_\_

i)  $(3 \times 12) + 5 =$  \_\_\_\_\_

j)  $3 \times (12 + 5) =$  \_\_\_\_\_

k)  $18 \times$  \_\_\_\_\_  $\times 25 = 1\,800$

l)  $56 \times 5 \times \underline{\hspace{2cm}} = 56\,000$

m)  $25 \times 38 \times 4 = \underline{\hspace{2cm}}$

n)  $1\,400 \div \underline{\hspace{2cm}} = 14$

o) one quarter of 84 =  $\underline{\hspace{2cm}}$

This time I have done  $\underline{\hspace{4cm}}$

#### 14. CLASS DISCUSSION: NEGATIVE NUMBERS

Discuss the following and find the answers:

- a) What is a negative number?
- b) Where are negative numbers used in everyday life?
- c) Draw or cut and paste examples of these from magazines, newspapers, etc. in the space provided.

#### + -15. REMEMBER

When keying in  $-5$ , press  $-$  5 on you pocket calculator, OR 5

- a) How does YOUR pocket calculator show negative numbers? (What must you key in?)
- b) Key in the number 7 on your pocket calculator. Subtract 2. Subtract 2 again.

Subtract 2 again. Subtract 2 again. What do you get? .....

Subtract 2 once more. Write down what your screen shows. ....

Subtract 2 again. What does the pocket calculator show now?

.....

+c) Use the constant function of your pocket calculator to program it to count from 6 in -3s. (**6 + 3 = =**) Write down the first 10 answers.

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16. Use your pocket calculator to do the following exercise. Remember the order of the operations. You may also make use of the memory function. Write down everything that you key in to obtain the answer.

a)  $13 - (11 + 8)$

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b)  $(-3) + 4 + (-2) + 9$

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c)  $-8 + 3 \times (-5 + 12)$

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d)  $-2 + 8 - 6 + (-4) - 9 + 12 + (-13)$

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## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.9:** We know this when the learner uses a range of techniques to perform calculations including:

**1.9.2:** using a calculator.

Fun with the pocket calculator

## MATHEMATICS

### Having Fun with Pocket Calculators and Negative Numbers

#### EDUCATOR SECTION

##### Memorandum

17. a) 5

b) -19

c) -10

d) 9

##### Leaner Section

##### Content

##### ACTIVITY: Fun with the pocket calculator [LO 1.10]

17. Are the following **true** or **false**? If false, calculate the correct answer:

a)  $4 + (-3) + 2 + 9 + (-2) + (-5)$

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b)  $4 + (-3) + (-1) + (-7) + (-4)$

---

c)  $1 + (-5) + 2 + (-4) + (-3) + (-1)$

---

d)  $-9 + (-2) + 11 + 13 + (-4)$

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## **Assessment**

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.10:** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

Negative Numbers (Number line)

MATHEMATICS

Having Fun with Pocket Calculators and Negative Numbers

EDUCATOR SECTION

Memorandum

19.1 a) -7

- a. 4
- b. -3
- c. 4
- d. -5

19.2 a) -10

- a. -2
- b. -4
- c. -5
- d. 19.3 a) -33; -26; 20; 48; 179

- a. -3 000; -300; -30; -3; 3
- b. -598; -387; -68; 0; 479; 1 009

19.4 7; -14; -37; 14; -25

17; -22; -38; 21; -56

Leaner Section

Content

ACTIVITY: Negative Numbers (Number line) [LO 1.3, LO 2.1]

18. DID YOU KNOW?

There were many mathematicians who did not like negative numbers. Diophantus, who was a Greek mathematician, thought it was “absurd”. Another mathematician, Stifel, thought the idea of negative numbers was “ridiculous”!

numbers become bigger19. Let us take a look at negative numbers on a number line:

-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8
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numbers become smaller



19.1 Work with a friend and indicate which number is:

- a) 2 smaller than  $-5$  \_\_\_\_\_
- b) 7 bigger than  $-3$  \_\_\_\_\_
- c) 5 bigger than  $-8$  \_\_\_\_\_
- d) 9 smaller than 5 \_\_\_\_\_
- e) 8 smaller than 3 \_\_\_\_\_

19.2 Circle the smallest number:

- a) -10 of -6
- b) 2 of -2
- c) -4 of 0
- d) -1 of -5

19.3 Arrange the following numbers from small to large:

- a) 20 ; 48 ; -26 ; -33 ; 179

\_\_\_\_\_

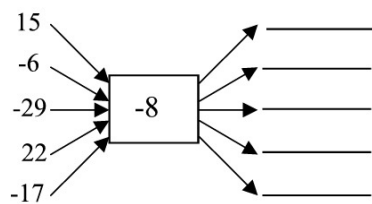
- b) -30 ; 3 ; -300 ; -3 ; - 3 000

\_\_\_\_\_

- c) 479 ; 0 ; -598 ; -387 ; 1 009 ; -68

\_\_\_\_\_

19.4 Calculate the output numbers in the flow diagram:



## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.3:** We know this when the learner recognises, classifies and represents the following numbers in order to describe and compare them.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and expands numeric and geometric patterns looking for a relationship or rules, including patterns.

Temperatures

## **MATHEMATICS**

### **Having Fun with Pocket Calculators and Negative Numbers**

#### **EDUCATOR SECTION**

##### **Memorandum**

- $<$
- $-30$  degrees Celsius =  $-22$  degrees Fahrenheit

21. a) Storm petrel en king penguin

a. No

c) I) 75 degrees

II) 50 degrees

- 70 degrees

d) No. Can not survive in temperatures below freezing point.

a. No. Can not survive in temperatures less than  $-10$  degrees.

b.  $-125$  degrees

22.  $x = 12; 3$

$x - 9 + 4; 0; -8; -12; -23$

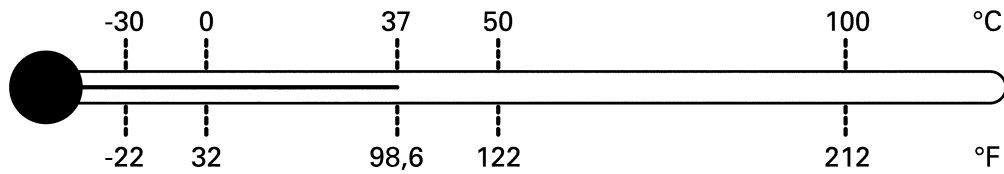
##### **Learner Section**

##### **Content**

## ACTIVITY: Temperatures [LO 2.6, LO 2.1]

### 20. DID YOU KNOW?

Water freezes at  $0^{\circ}\text{C}$  and boils at  $100^{\circ}\text{C}$ . A Swedish astronomer discovered the Celsius scale. Examine the difference between the Celsius scale and the Fahrenheit scale.



20.1 Fill in:  $<$  ;  $>$  or  $=$  :  $-30 \dots\dots -22$

20.2 According to the thermometer on the previous page  $-30^{\circ}\text{C} = -22^{\circ}\text{F}$ . Explain how this is possible.

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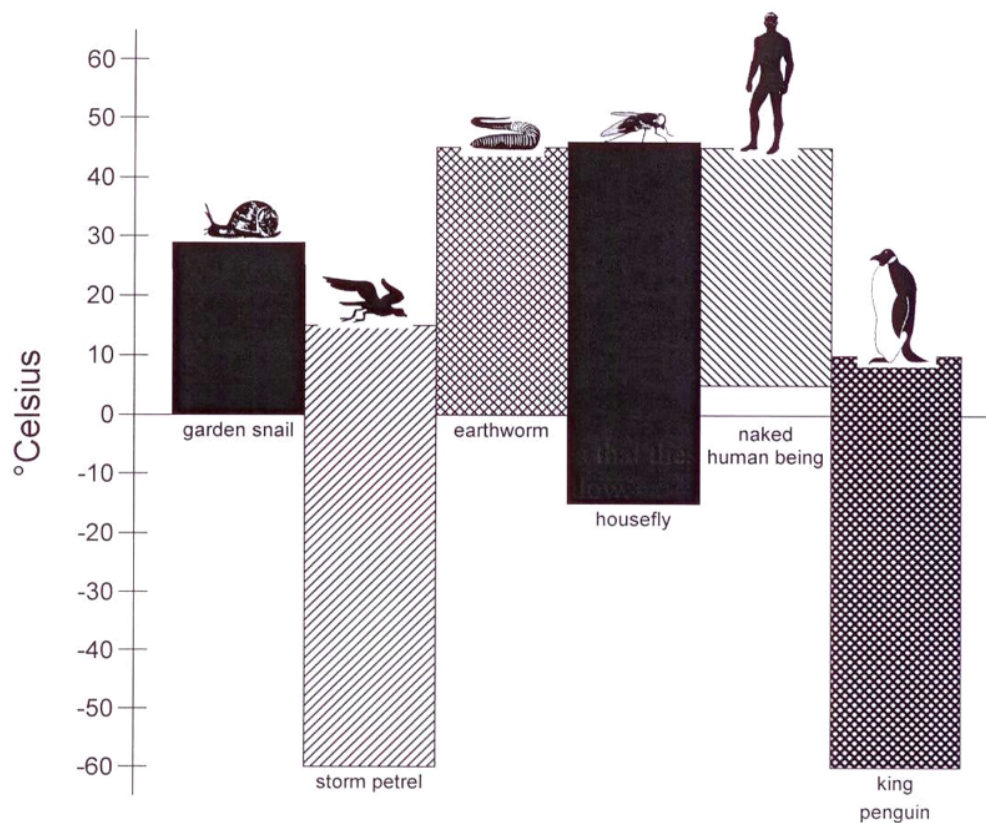
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21. Look at the maximum and minimum temperatures that these living organisms are able to withstand. Then answer the questions that follow.



a) Who / what can survive at  $-60^{\circ}\text{C}$ ?

b) Can an earthworm survive temperatures below freezing point?

c) What is the difference between the minimum and maximum temperatures at which the following living organisms can exist?

i) storm petrel

---

ii) housefly

---

iii) king penguin

---

d) Will a garden snail be able to survive in London in December?

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Motivate your answer.

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e) Do you think that you will find many houseflies around the North Pole?

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Motivate your answer.

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f) Take another look at the illustration. What is the sum of the minimum temperatures for all the organisms?

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22. Can you complete the following table?

x	5	-3	-7			-18
$x - 9 + 4$				7	-2	

## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and expands numeric and geometric patterns looking for a relationship or rules, including patterns;

**Assessment Standard 2.6:** We know this when the learner describes a situation by interpreting a graph of the situation, or draws a graph from a description of a situation (e.g. height of a roller-coaster car over time; the speed of a racing car going around a track).



## Having Fun with Pocket Calculators and Negative Numbers

### MATHEMATICS

## Having Fun with Pocket Calculators and Negative Numbers

### EDUCATOR SECTION

#### Memorandum

23. a) -7 m

a. -20 m

b. -16 m

c. -15 m

25. 22nd floor

#### Leaner Section

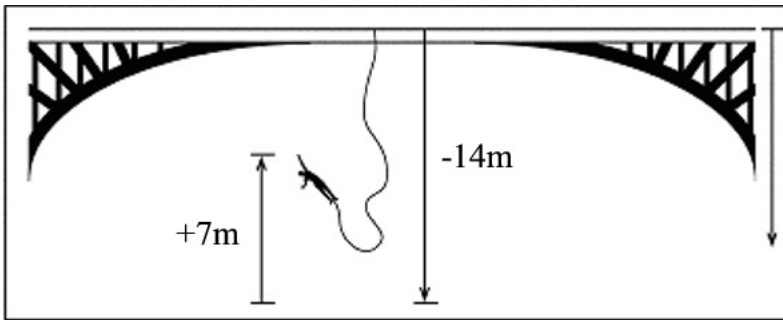
#### Content

#### ACTIVITY: Having Fun with Pocket Calculators and Negative Numbers

23. Some friends decided to go bungee jumping. Calculate how far below the bridge each one turned.

a)

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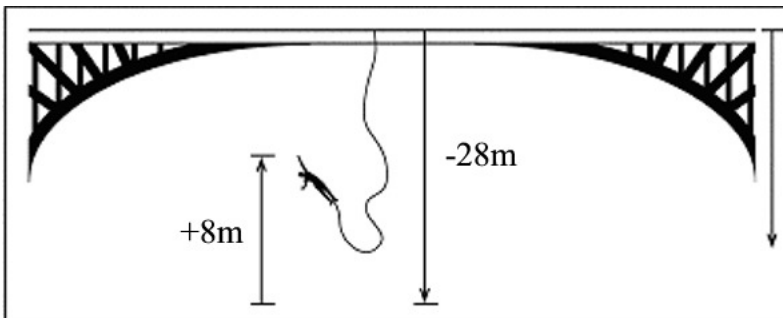


b)

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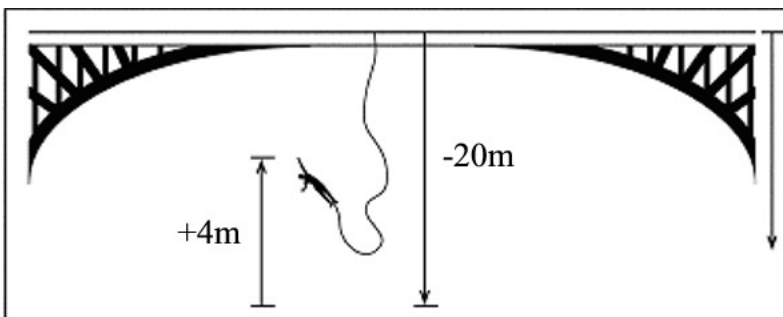


c)

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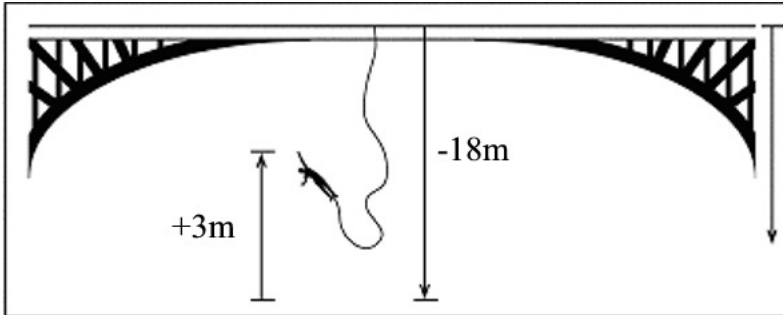


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d)

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## 24. LET'S PLAY A GAME!!

Work with a friend. Remove the Jack, Queen, King, Ace and Joker from a deck of playing cards. Place the rest of the cards face down between the two of you. Take number 10 as a starting point.

**Player 1:** Pick up a card. If it is a black card, add the total / the number on the card to 10, but subtract the number if the card is red.

**Player 2:** Pick up a card. Do the same as player 1.

The players must check each other's answers. Use a pocket calculator if you are unsure. Continue playing until the totals / numbers on all the cards have been added or subtracted.

## 25. BRAIN TEASER!

You are in a lift on the 4<sup>th</sup> floor of a building with basement floors. You come down 6 floors, then go up 13 floors and then come down 11 floors. Then you come down 9 floors and go up 23. You come down 17 floors again and go up 25. At which floor will you get out? \_\_\_\_\_. Show this in a sketch or on a number line.

## 26. CHALLENGE!

Draw a time line on which you indicate important events that occurred before as well as after your birth. Indicate your birth year as 0.

## 27. SELF-ASSESSMENT

Tick in the appropriate block:

I can	GOOD	BETTER	BEST
provide examples of negative numbers from everyday life.	_____	_____	_____
key in negative numbers correctly into my pocket calculator.	_____	_____	_____
arrange negative numbers from smallest to largest and vice versa.	_____	_____	_____
add and subtract negative numbers with the help of my pocket calculator.	_____	_____	_____
complete flow	_____	_____	_____

diagrams with negative numbers correctly.			
do calculations involving negative numbers without a pocket calculator.	_____	_____	_____

Rectangular and triangular numbers

## **MATHEMATICS**

### **Estimations, Equations and Variables**

#### **EDUCATOR SECTION**

##### **Memorandum**

1. (b) quadrate number

2.

(a)

(b) No not quadrate of number

(c) No  $1 + 2 + 3 + 4 + 5$

3.

(b) 64; 125; 216; 343

(c) 64

(d) 64 000

(e) 274 625

(f) K4: + 64

K5: + 64 + 125 = 225

(g)  $1 + 8 + 27 + 64 + 125 + 216 = 441$

(h) all square number

##### **Leaner Section**

##### **Content**

**ACTIVITY: Rectangular and triangular numbers [LO 1.3.4, LO 1.7.2, LO 1.7.7, LO 2.3.1, LO 2.3.3]**

1. Do you still remember?

In module 1 we learnt about square numbers and triangular numbers.

a) Can you explain to your partner what these patterns are like?

b) What is the synonym for square numbers?

2. Let us have a look at RECTANGULAR NUMBERS.

Did you know?

Each counting number bigger than 0 is a rectangular number. The Greeks used the term rectangular number for the product of two consecutive numbers only,

e.g.  $42 = 6 \times 7$ .

When we draw rectangular numbers, they will look like this:

—	—	—	—	—	—			—	—	—	
<b><math>6 = 1 \times 6</math></b>								—	—	—	
								<b><math>6 = 2 \times 3</math></b>			

a) Now draw as many sketches as possible to represent the rectangular number 18.

b) Is 18 a square number? \_\_\_\_\_ Why/why not?

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c) Is 18 a triangular number? \_\_\_\_\_ Why/why not?

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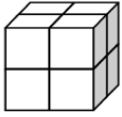
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3. Did you know?

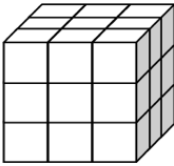
a) We also have numbers to the power of three!! These numbers are also known as cubed numbers. Take a good look at the examples:



$$1 = 1 \times 1 \times 1$$



$$8 = 2 \times 2 \times 2$$



$$27 = 3 \times 3 \times 3$$

b) Predict what the following four cubed numbers will be (you may use your pocket calculator).

\_\_\_\_\_;

\_\_\_\_\_;

\_\_\_\_\_;

\_\_\_\_\_;

c) List any of the above numbers that may be a square number: \_\_\_\_\_

d) What will the 40th cubed number be? \_\_\_\_\_

e) What is 653 (to the power of 3)? \_\_\_\_\_

f) Take a good look at the following. Can you complete the table?

Cubed numbers	Sum of the cubed numbers
K1	1



K2	$1 + 8 = 9$
K3	$1 + 8 + 27 = 36$
K4	$1 + 8 + 27 + \dots = 100$
K5	$1 + 8 + 27 + \dots + \dots = \dots$

g) Can you predict what the sum of the first 6 cubed numbers will be?

---

h) What do you notice about the numbers in the second column?

---

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.3:** We know this when the learner recognises, classifies and represents the following numbers in order to describe and compare them:

**1.3.4:** numbers in exponential form including squares of natural numbers to at least  $12^2$ , cubes of natural numbers to at least  $5^3$ , and their square and cube roots.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

**1.7.2:** multiple operations with integers;

**1.7.7:** exponents.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways using:

**2.3.1:** verbal descriptions;

**2.3.3:** tables.

Estimations, Equations and Variables (Mental calculation test)

## **MATHEMATICS**

### **Estimations, Equations and Variables**

#### **EDUCATOR SECTION**

##### **Memorandum**

##### **4. Own attempts**

5. (a) 202

(b) 485

(c) 8

(d) 8

(e) 7

(f) 56

(g) 820

(h) 96

(i) 470

(j) 18 400

(k) 40

(l) 64

(m) 10 000

(n) 64

(o) 1 000 000

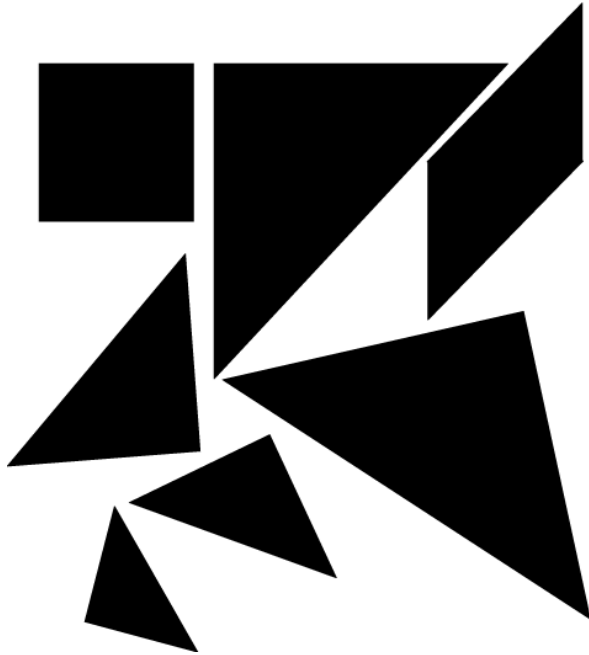
## **Learner Section**

### **Content**

**ACTIVITY: Estimations, Equations and Variables (Mental calculation test) [LO 1.7.2, LO 1.7.7, LO 1.8, LO 1.10]**

#### 4. Brainteaser!

Can you form a square / rectangle / triangle with the following seven tangram pieces?



Trace the shapes on a separate sheet of paper, cut them out and arrange the pieces. Then glue them in a frame..

5. Let's first see how you cope with "ordinary" numbers!

Complete the following mental calculation test as quickly and accurately as possible:

a)  $179 + 23 =$  \_\_\_\_\_

b)  $512 - 27 =$  \_\_\_\_\_

c)  $9 \times$  \_\_\_\_\_  $= 72$

d) \_\_\_\_\_  $\times 6 = 48$

e)  $63 \div 9 =$  \_\_\_\_\_

f) \_\_\_\_\_  $\div 8 = 7$

g)  $24\,600 \div 30 =$  \_\_\_\_\_

h)  $(60 \div 5) \times (32 \div 4) =$  \_\_\_\_\_

i)  $3 \times 47 + 7 \times 47 =$  \_\_\_\_\_

j)  $25 \times 184 \times 4 =$  \_\_\_\_\_

k)  $158 - 130 + 12 =$  \_\_\_\_\_

l)  $82 =$  \_\_\_\_\_

m)  $1002 =$  \_\_\_\_\_

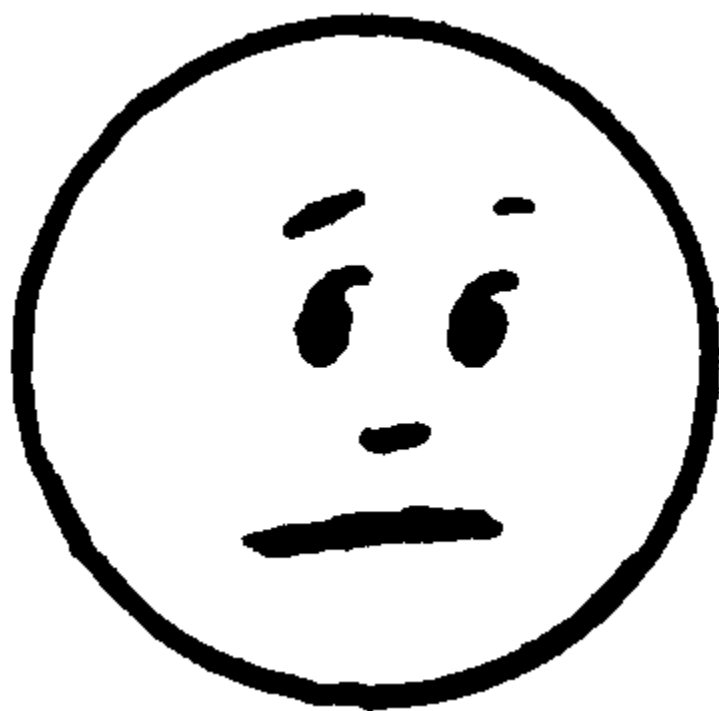
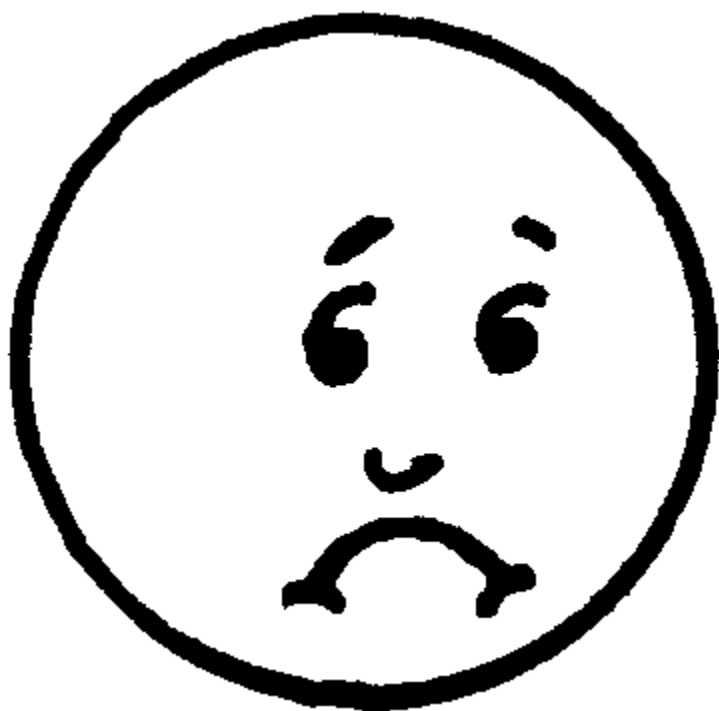
n)  $43 =$  \_\_\_\_\_

o)  $1003 =$  \_\_\_\_\_.....

15

Complete by colouring in the appropriate block:

I have performed





## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

**1.7.2:** multiple operations with integers;

**1.7.7:** exponents.

**Assessment Standard 1.8:** We know this when the learner performs mental calculations involving squares of natural numbers to at least  $10^2$  and cubes of natural numbers to at least  $5^3$ ;

**Assessment Standard 1.10:** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

## Estimations, Equations and Variables (Magic square)

# MATHEMATICS

## Estimations, Equations and Variables

## EDUCATOR SECTION

# Memorandum

6. 12

7 (a) 18

(b) 13

(c) 17

(d) 19

(e) 12

**Sum: 45**

## 2.1






8.

1	14	7	12
15	4	9	6
10	5	16	3
8	11	2	13

Sum: 34

9. (a) 48

(b) 10

(c) 64

(d) 90

(e) 108

10. (a) true

(b) true

(c) false

(d) false

(e) true

11.

_____	_____	_____
_____	_____	_____

_____	_____	_____
-------	-------	-------

12.

9 969	_____	9 699	_____
_____	_____	_____	6 669
6 966	9 669	6 696	_____
6 699	_____	6 969	9 666

### 13. Learners own assessment

#### Leaner Section

#### Content

#### **ACTIVITY: Estimations, Equations and Variables (Magic square) [LO 1.7.2, LO 1.9.1, LO 1.10, LO 2.5]**

6. Do you still remember?

The sum of all the numbers in a magic square is the same, whether they are arranged horizontally, vertically or diagonally.

What is the sum of the following magic square? \_\_\_\_\_

1	8	3
6	4	2
5	0	7

7. Sometimes we substitute numbers with letters of the alphabet.

Look at the following magic square. Now replace the letters with the correct numbers.

<table border="1" style="border-collapse: collapse; margin: auto;"> <tr> <td style="padding: 5px; text-align: center;">a</td> <td style="padding: 5px; text-align: center;">11</td> <td style="padding: 5px; text-align: center;">16</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="padding: 5px; text-align: center;">b</td> <td style="padding: 5px; text-align: center;">15</td> <td style="padding: 5px; text-align: center;">c</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="padding: 5px; text-align: center;">14</td> <td style="padding: 5px; text-align: center;">d</td> <td style="padding: 5px; text-align: center;">e</td> <td style="padding: 5px;"></td> </tr> </table>	a	11	16		b	15	c		14	d	e		<div style="display: flex; justify-content: space-between;"> <div>a: _____</div> <div>b: _____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>c: _____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>d: _____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div>e: _____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>_____</div> <div></div> </div>
a	11	16											
b	15	c											
14	d	e											

What is the sum of the magic square? \_\_\_\_\_

8. Brainteaser!

In the following magic square the numbers have been replaced by letters.

c	$3k + 2c$	$k + 3c$	$2k + 4c$
$3k + 3c$	$4c$	$2k + c$	$k + 2c$
$2k + 2c$	$k + c$	$3k + 4c$	$3c$
$k + 4c$	$2k + 3c$	$2c$	$3k + c$

What is the sum of the magic square? \_\_\_\_\_

9. We can also assign values to particular letters, e.g.

$a = 9$  ;  $b = 6$  ;  $c = 8$  ;  $d = 2$  ;  $e = 10$  and  $f = 20$

Calculate:

a)  $b \times c =$  \_\_\_\_\_

b)  $f \div d =$  \_\_\_\_\_

c)  $a \times b + e =$  \_\_\_\_\_

d)  $(f - e) \times a =$  \_\_\_\_\_

e)  $[(c - d) + b] \times a =$  \_\_\_\_\_

10. Replace the letters with any number of your choice and check whether the statements are true or false.

a)  $e + f = f + e$  \_\_\_\_\_

b)  $2k + 2c = 2 \times (k + c)$  \_\_\_\_\_

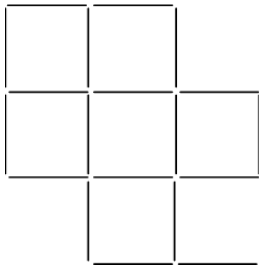
c)  $h - g = g - h$  \_\_\_\_\_

d)  $4b = 4 + b$  \_\_\_\_\_

e)  $x + (y + z) = (x + y) + z$  \_\_\_\_\_

11. Brainteaser!

Construct your own magic square. Reduce the seven squares to five by moving only four of the toothpicks. Make a drawing of your attempt in the space that is provided and show which toothpicks have been moved to which position.



12. Another Brainteaser!

Can you complete the following magic square with numbers using 6's and/or 9's only?  
(Remember that the sum of the numbers in each row, column or diagonal must be the same!)

	6 666		6 996
9 696	6 999	9 966	
			9 999
	9 996		

### 13. Time for self-assessment

Place a tick in the appropriate space.

	Unsure	Fairly sure	Very sure
I am able to explain the following and to give an example:	_____	_____	_____
a) square number	_____	_____	_____
b) rectangular number	_____	_____	_____
c) cubed number	_____	_____	_____
I know a synonym for:	_____	_____	_____
a) square number	_____	_____	_____
b) cubed number	_____	_____	_____
I can replace letters with numbers to complete a magic square	_____	_____	_____
I can do the 4 main calculations correctly after having replaced the letters with numerical values	_____	_____	_____

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and

confidence in solving problems.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

**1.7.2:** multiple operations with integers;

**Assessment Standard 1.9:** We know this when the learner uses a range of techniques to perform calculations including:

**1.9.1:** using the commutative, associative and distributive properties with positive rational numbers and zero;

**Assessment Standard 1.10:** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.5:** We know this when the learner solves or completes number sentences by inspection or by trial-and-improvement, checking the solutions by substitution (e.g.  $2x - 8 = 4$ ).

Estimations, Equations and Variables (Algebraic equations)

MATHEMATICS

Estimations, Equations and Variables

EDUCATOR SECTION

Memorandum

14. (a) 100

(b) 12

(c) 124

(d) 8

15. (a) 10 99 75 5

(c)

_____	8	_____	21
39	_____	74	_____

16.2 (a)  $5x + 7 = 22$

(b)  $8x - 10 = 46$

(c)  $5 + 9x = 59$

(d)  $x - 13 = 6$

16.3 (a) 21

(b) 17

(c) 34

18 (a) 72 (j) 30

(b) 12 (k) 5

(c) 7 (l) 57

(d) 141 000 (m) 9

a. 900 (n) 9 987

b. 47 (o) 125

(g) 135

(h) 336

(i) 7

20. (a)  $x > 10$

(b)  $y < 2\,000$

(c)  $(c+8) > 6$

(d)  $y < 50$

(e)  $k - (k \div 2) < 20$

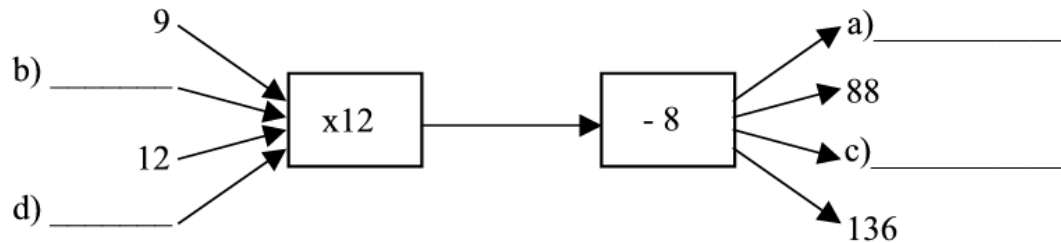
## **Leaner Section**

## **Content**



**ACTIVITY: Estimations, Equations and Variables (Algebraic equations) [LO 1.7.2, LO 1.9.1, LO 1.10, LO 2.5]**

14. Now replace the letters with the correct numbers in the following flow diagram:



15. Puzzles!

a) Can you solve the following?

I am thinking of a particular number. When I multiply this number by 7, then subtract 6 and divide the answer by 8, the quotient is 8. What is the number that I have in mind?

\_\_\_\_\_

I am starting with 9. When I multiply this by 12, then add 2 and subtract 11, the answer is \_\_\_\_\_

\_\_\_\_\_

What answer will I get if I start with 7?

\_\_\_\_\_

And if I start with 5?

\_\_\_\_\_

b) We can compile a table that will help us with problems like these.

Number	9	7	5
$\text{Number} \times 12 + 2 - 11$	99	75	51

c) We could replace the word "number" with any letter of the alphabet. Can you fill in the missing numbers in the following table?

k	6	_____	13	_____
$(k \times 5) + 9$		49		114

d) Tell your partner how you obtained the answers.

16.1 Did you know?

The statement  $(k \times 5) + 9 = 49$  is referred to as an algebraic equation. "Algebra" is the "study of number sentences".

16.2 Write the algebraic equation for the following:

a) A particular number  $x$   $5 + 7 = 22$

\_\_\_\_\_

\_\_\_\_\_

b)  $8 \times \text{a number} - 10 = 46$  \_\_\_\_\_

c)  $5 + (9 \times \text{a number}) = 59$  \_\_\_\_\_

d) When 13 is subtracted from a bigger number the difference is 6.

---

---

16.3 Solve the following equations: (You may use your pocket calculator).

a)  $49 \times a - 29 = 1\,000$

---

---

b)  $(b + 15) \times 6 = 192$

---

---

c)  $16 \times c - 15 = 529$

---

---

17. Did you know?

The letters that are used in place of numbers are called variables.

18. Let's first see how you do in your next mental arithmetic test.

a)  $9 \times 8 =$  \_\_\_\_\_

b) \_\_\_\_\_  $\times 4 = 48$

c)  $4 \times$  \_\_\_\_\_  $= 28$

d)  $6 \times 235 \times 100 =$  \_\_\_\_\_

e)  $25 \times 9 \times 4 =$  \_\_\_\_\_

f)  $16 + 17 + 14 =$  \_\_\_\_\_

g)  $104 + 15 + 16 =$  \_\_\_\_\_

h) Triple: 112: = \_\_\_\_\_

i)  $42 \div 6 =$  \_\_\_\_\_

j) \_\_\_\_\_  $\div 6 = 5$

k)  $35 \div$  \_\_\_\_\_  $= 7$

l)  $(7 \times 3) + (4 \times 9) =$  \_\_\_\_\_

m)  $4 \times 9 +$  \_\_\_\_\_  $= 45$

n)  $10\,000 - 13 =$  \_\_\_\_\_

o) 5 to the power of 3 = \_\_\_\_\_

15

19. Did you know?

When we use  $>$  and  $<$ -signs in numbers sentences, e.g. when we want to say that a number divided by 4 is smaller than 5, we write it like this:

$$y \div 4 < 5$$

If we, for example, wished to say that a number multiplied by 5 is greater than 16, we would write it like this:

$$b \times 5 > 16$$

Number sentences like these, which do not have the  $=$  sign, are called inequalities.

20. Write the following word sentences as inequalities:

a) The number of sweets that I have is more than 10.

---

---

b) The number of learners in our school is greater than 2 000.

---

---

c) A number increased by 8, is greater than 6.

---

---

d) There are less than 50 learners in our class.

---

---

e) If I give away half of my marbles, I shall have fewer than 20.

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

**1.7.2:** multiple operations with integers;

**1.7.7:** exponents;

**1.10:** uses a range of strategies to check solutions and judges the reasonableness of solutions.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner solves or completes number sentences by inspection or by trial-and-improvement, checking the solutions by substitution (e.g.  $2 \times 8 = 4$ ).

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns;

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways using:

**2.3.2:** flow diagrams;

**2.3.3:** tables;

**Assessment Standard 2.5:** We know this when the learner solves or completes number sentences by inspection or by trial-and-improvement, checking the solutions by substitution (e.g.  $2 \times 8 = 4$ ).

## Estimations, Equations and Variables (Algebraic equations)

### MATHEMATICS

### Estimations, Equations and Variables

### EDUCATOR SECTION

### Memorandum

21. (a)

Days	—	—	—	—	5	—	—	49
<b>Bo x es</b>	—	—	150	200	—	600	$\frac{1}{750}$	—

22.

(b)

Sketch	—	—	—	—	—	—
Number of squares	4	7	10	13	25	40

(c) Squares =  $1 + (\text{Sketch No.} \times 3)$

(d) (i)  $1 + (25 \times 3) = 76$

- i.  $1 + (37 \times 3) = 112$
- ii.  $1 + (101 \times 3) = 304$

(e) (i) 43

- i. 55
- ii. 80

23. (a)  $u = i \div 4$

(b)  $u = (i \times 2) + 1$

24. (a) Input

money

24. (a) <b>Inputmoney</b>	R1	R5	R30	R50	R100
Output : flower bulbs	3	15	90	150	300

(b)

InputNights	1	7	10	15	31
Output Cost	R280	R1 960	R2 800	R4 200	R8 680

(c)



InputKg	1	2½	4	5¼	19
OutputAmount	R6,20	R17	R27,70	R35,70	R129,78

## Learner Section

### Content

#### **ACTIVITY: Estimations, Equations and Variables (Algebraic equations) [LO 2.1, LO 2.3.3, LO 2.2, LO 2.4]**

21. Let us see if we can formulate rules to solve equations by looking at patterns.

Every day the Cape Market purchases 50 boxes of grapes from a farmer.

a) Complete the following table:

Days	1	2	3	4		12	35	
Boxes	50	100			250			2 450

b) We can check if you are correct by writing an algebraic equation for the above:

$$b \text{ (boxes)} = d \text{ (days)} \times 50$$

$$\text{Therefore: } c = 3 \times 50$$

$$= 150 \text{ (3rd day)}$$

$$c = d \times 50$$

$250 = d \cdot 50$

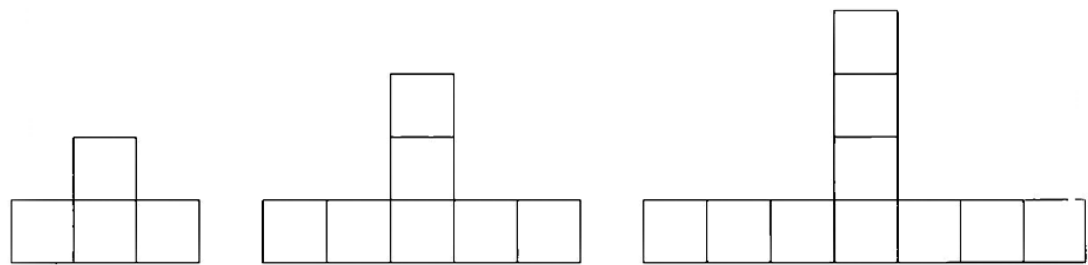
$250 \div 50 = d$

$5 = d$

On day 5 the market had already bought 250 boxes of grapes.

c) Work with a partner and check the rest of your work in the same way.

22. Examine the following three sketches:



a) Can you explain to a friend the pattern that is formed here?

b) Complete this table:

Sketch	1	2	3	4	8	13
Number of squares						

c) Can you write down the equation by which you can determine your solution?

\_\_\_\_\_

\_\_\_\_\_

d) Use your equation to determine the number of squares in

(i) sketch 25: \_\_\_\_\_

(ii) sketch 37: \_\_\_\_\_

(iii) sketch 101: \_\_\_\_\_

e) Which sketches will contain the following number of squares?

(i) 130: \_\_\_\_\_

(ii) 166: \_\_\_\_\_

(iii) 241: \_\_\_\_\_

23. Are you able to write a rule (an algebraic equation) for the relationship between the input and output numbers in the following table?

a)

Input (i)	16	28	48	60
Output (o)	4	7	12	15

b)

Input (i)	105	115	125	135
Output (o)	211	231	251	271

24. Compile tables for the following (You may use your pocket calculator):

a) Flower Pot Nursery sells flower bulbs at 3 for a rand. Indicate in your table how many bulbs would be sold for R1,00 ; R5,00 ; R30,00 ; R50,00 and R100,00.

b) The Good Rest Holiday Resort's tariff is R280,00 per person per night. Indicate in your table the cost for one person for the following number of nights: 1 ; 7 ; 10 ; 15 ; 31.

c) At Sally's Supermarket you can buy grapes at R6,80 a kilogram. Indicate in your table how much you would pay for: 1 kg ; 2 ½ kg ; 4 kg ; 5¼ kg ; 19 kg grapes.

## 25. Time for Self-Assessment

- Make a cross on the scale of 1 to 5 for each of the following:

	Struggling		So-so		Capable	
	1	2	3	4	5	
I can determine output numbers from a flow diagram correctly	—	—	—	—	—	
I can determine input numbers from a flow diagram	—	—	—	—	—	
I understand the replacing of numbers with letters of the alphabet.	—	—	—	—	—	
I understand what "variables" are.	—	—	—	—	—	
I understand the replacing of letters of the alphabet with numbers.	—	—	—	—	—	

I can write algebraic equations for given number sentences.	—	—	—	—	—	
I can resolve algebraic equations.	—	—	—	—	—	
I can write number sentences by making use of inequalities.	—	—	—	—	—	
I am able to formulate rules for solving equations by looking at patterns and can write down equations for them.	—	—	—	—	—	
I can compile tables from given information.	—	—	—	—	—	

## MODULE TEST

Let us see if we can apply all the previous knowledge.

1. Just write down the answer:

a)  $43 =$  \_\_\_\_\_ b)  $93 =$  \_\_\_\_\_ (2)

2. True or false?

a) 125 is a cubed number \_\_\_\_\_

b) 125 is a square number \_\_\_\_\_

c)  $v - w = w - v$  \_\_\_\_\_

d)  $(g + h) \times j = (g \times j) + (h \times j)$  \_\_\_\_\_ (4)

3. If  $m = 16$  ;  $n = 9$  and  $p = 18$ , calculate:

a)  $(m \times n) + p$  \_\_\_\_\_

b)  $p, n \times m^2$  \_\_\_\_\_ (2)

4. Write an algebraic equation for the following:

a) If I subtract 347 from a number, the answer is 1706.

\_\_\_\_\_ (1)

b) The product of a certain number and 598 is equal to the difference between 80 000 and 6 446

\_\_\_\_\_ (2)

5. Write number sentences by using inequalities:

a) One quarter of the red shoes is less than half of the green shoes.

\_\_\_\_\_ (1)

b) Everyday more than 100 000 people read the newspaper.

\_\_\_\_\_ (1)

6.1 Write an equation for the following table:

Input	5	10	15	20	25	30		
Output	28	53	78	103	128		228	328

\_\_\_\_\_ (1)

6.2 Use the equation to complete the table. (3)

7. Compile a table for the following:

At the Happy Fruit Stall you can buy 1 kg of apples for R6,99. In your table, indicate the cost of 2 and a half kg ; 8 kg ; 13 kg (3)

## **Assessment**

***Learning Outcome 2:*** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

***Assessment Standard 2.2::*** We know this when the learner describes, explains and justifies observed relationships or rules in own words;

***Assessment Standard 2.3:*** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways using:

2.3.3: tables;

***Assessment Standard 2.4:*** We know this when the learner constructs mathematical models that represent, describe and provide solutions to problem situations, showing responsibility toward the environment and the health of others (including problems within human rights, social, economic, cultural and environmental contexts).

Fractions - 01

## MATHEMATICS

### Common fractions

### EDUCATOR SECTION

#### Memorandum

1. a)  $\frac{7}{10}$

b)  $\frac{3}{10}$

c)  $\frac{4}{10}$  or  $\frac{2}{5}$

d)  $\frac{6}{10}$  or  $\frac{3}{5}$

3.1 a) a)  $1\frac{4}{7}$

b)  $2\frac{2}{7}$

b) a)  $-\frac{3}{4}$

b)  $-\frac{1}{4}$

c)  $2\frac{3}{4}$

c) a)  $98\frac{3}{5}$

b)  $99\frac{1}{5}$

c)  $100\frac{4}{5}$



a.  $102 \frac{1}{5}$

## LEARNER SECTION

### Content

#### ACTIVITY: Fractions [LO 2.7.4, LO 1.10]

1. Let us start straight away! Look carefully at the picture.



Work with a friend to find out:

a) What fraction of the class is girls?

\_\_\_\_\_

b) What fraction of the class is boys?

\_\_\_\_\_

c) What fraction of the learners is sitting?

\_\_\_\_\_

d) What fraction of the learners is standing?

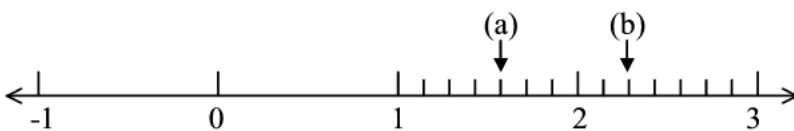
\_\_\_\_\_

2. Conduct a survey of the learners in YOUR class and complete the table:

FRACTION OF THE CLASS	GIRLS	BOYS
Fraction that has blue eyes	_____	_____
Fraction with blonde hair	_____	_____
Fraction that loves Maths	_____	_____
Fraction that takes part in sport	_____	_____
Fraction that studies music	_____	_____

3.1 Write down the fraction indicated by the arrows.

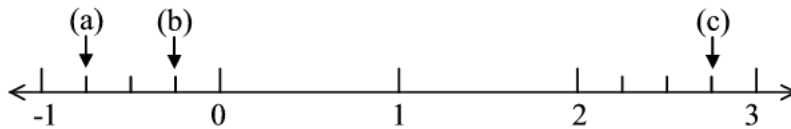
a)



(a) \_\_\_\_\_

(b) \_\_\_\_\_

b)

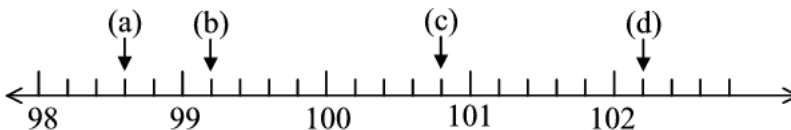


(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

c) \_\_\_\_\_



(a) \_\_\_\_\_

(b) \_\_\_\_\_

(c) \_\_\_\_\_

(d) \_\_\_\_\_

### 3.2 Did you know?

When there are negative and positive numbers on a number line together with fractions, these numbers are called rational numbers. All these number lines above are thus number lines containing rational numbers.

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.10:** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.7:** We know this when the learner determines, analyses and interprets the equivalence of different descriptions of the same relationship or rule presented:

2.7.4: by equations or expressions.

## MATHEMATICS

### Common fractions

## EDUCATOR SECTION

### Memorandum

4.

a) proper fractions

b) improper fractions

c) mixed numbers

5.

a) $3 \frac{1}{2}$	$5 \frac{1}{2}$
b) $\frac{2}{8} / \frac{1}{4}$	$\frac{6}{8} / \frac{3}{4}$
c) $\frac{7}{16}$	$\frac{9}{16}$
d) $\frac{3}{12} / \frac{3}{4}$	$\frac{9}{12} / \frac{3}{4}$

## LEARNER SECTION

## Content

### ACTIVITY: Fractions [LO 2.1.5]

4. Let us first revise.

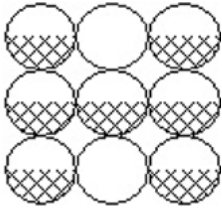
Do you still remember?

A fraction is a part of a whole:  $\frac{3}{5}$   $\frac{\text{numerator}}{\text{denominator}}$

- Join column A with the correct answer in column B:

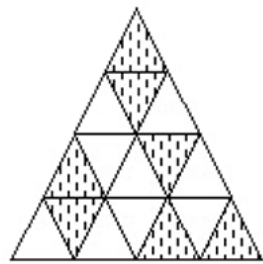
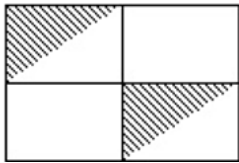
	A		B
a)	the numerator is smaller than the denominator e.g. $\frac{4}{7}$		mixed numbers
b)	the numerator is bigger than the denominator e.g. $\frac{9}{2}$		proper fractions
c)	natural numbers plus a common fraction e.g. $1\frac{3}{4}$		improper fractions

5. Look at the following figures and then complete the table:



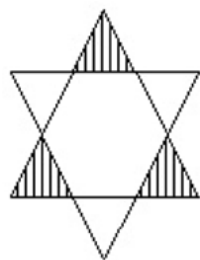
a)

b)



c)

d)



	Fraction coloured in	Fraction not coloured in
a)	_____	_____
b)	_____	_____
c)	_____	_____
d)	_____	_____

## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns:

2.1.5: represented in tables.



Fractions - 03

## **MATHEMATICS**

### **Common fractions**

## **EDUCATOR SECTION**

### **Memorandum**

7.

(a) 24

(b) 34

(c) 54

(d) 22

(e) 32

(f) 42

(g) 9

(h) 7

(i) 6

(j) 56

(k) 108

(l) 109

(m) 24

(n) 76

(o) 64

## LEANER SECTION

### Content

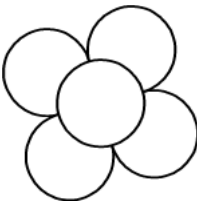
#### ACTIVITY: Fractions [LO 1.10]

##### 6. BRAIN-TEASER!

Colour in the given fraction in the following figures:



a)



b)

7. Let us see if you can still think quickly! Complete the following mental test as accurately and quickly as possible:

a)  $6 + 18 =$  \_\_\_\_\_

b)  $16 + 18 =$  \_\_\_\_\_

c)  $16 + 38 =$  \_\_\_\_\_

d)  $14 + 8 =$  \_\_\_\_\_

e)  $18 + 14 =$  \_\_\_\_\_

f)  $18 + 24 =$  \_\_\_\_\_

g)  $4 \times$  \_\_\_\_\_  $= 36$

h)  $5 \times$  \_\_\_\_\_  $= 35$

i)  $48 \div$  \_\_\_\_\_  $= 8$

j) \_\_\_\_\_  $\div 7 = 8$

k) \_\_\_\_\_  $\div 9 = 12$

l) of 218 = \_\_\_\_\_

m) of 96 = \_\_\_\_\_

n)  $92 - 16 =$  \_\_\_\_\_

o)  $83 - 19 =$  \_\_\_\_\_

- Colour in the applicable block:

My achievement	GOOD	AVERAGE	NOT SO GOOD	
-------------------	------	---------	----------------	--

## **Assessment**

***Learning Outcome 1:*** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

***Assessment Standard 1.10:*** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

## MATHEMATICS

### Common fractions

#### EDUCATOR SECTION

##### Memorandum

8. a) a)  $\frac{2}{6}$

b)  $\frac{1}{3}$

c)  $\frac{3}{9}$

d)  $\frac{4}{12}$

b) Every one eats the same amount of food. / Fractions are the same.

9.  $\frac{2}{3} = \frac{6}{9}$

$$\frac{4}{5} = \frac{80}{100}$$

$$\frac{18}{20} = \frac{9}{10}$$

$$\frac{75}{100} = \frac{3}{4}$$

$$\frac{2}{3} = \frac{16}{24}$$

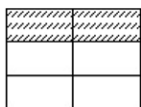
$$\frac{25}{30} = \frac{5}{6}$$

#### LEARNER SECTION

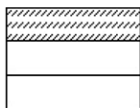
##### Content

##### ACTIVITY: Fractions [LO 1.4.1, LO 1.11, LO 2.1.5]

8. Four learners have been rewarded with a chocolate for their good work. They don't eat it up immediately, but only the section that has been coloured in.

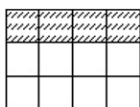
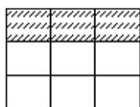


i)



ii)

iii)



iv)

a. What fraction does each one eat?

i) Carli: \_\_\_\_\_

ii) Peter-John: \_\_\_\_\_

iii) Kayla: \_\_\_\_\_

iv) Vusi: \_\_\_\_\_

b) What do you notice?

---



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8.2 Do you still remember?

In our example  $\frac{2}{6} = \frac{1}{3} = \frac{3}{9} = \frac{4}{12}$

We call these fractions equivalent fractions.

Equivalent fractions are thus the same quantity or equal to each other

8.3 TAKE NOTE:

To form an equivalent fraction, you must multiply or divide the numerator AND denominator by THE SAME NUMBER.

e.g.	<table><tr><td>2</td><td>×</td><td>4</td></tr><tr><td>5</td><td>×</td><td>4</td></tr></table>	2	×	4	5	×	4	=	<table><tr><td>8</td></tr><tr><td>20</td></tr></table>	8	20	;	<table><tr><td>18</td><td></td><td>6</td></tr><tr><td>24</td><td></td><td>6</td></tr></table>	18		6	24		6	=	<table><tr><td>3</td></tr><tr><td>4</td></tr></table>	3	4
2	×	4																					
5	×	4																					
8																							
20																							
18		6																					
24		6																					
3																							
4																							

9. Join the fraction in column A with its equivalent in column B:

A		B
$\frac{2}{3}$		$\frac{3}{4}$
$\frac{4}{5}$		$\frac{6}{9}$
$\frac{18}{20}$		$\frac{9}{10}$
$\frac{75}{100}$		$\frac{5}{6}$
$\frac{2}{3}$		$\frac{16}{24}$
$\frac{25}{30}$		$\frac{80}{100}$

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.4:** We know this when the learner recognises and uses equivalent forms of the rational numbers listed above, including:

1.4.1: common fractions;

1.11: recognises, describes and uses:

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

***Assessment Standard 2.1:*** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns:

2.1.5: represented in tables.



## MATHEMATICS

### Common fractions

## EDUCATOR SECTION

### Memorandum

10.  $\frac{2}{3} = \frac{40}{60}$ ;  $\frac{3}{4} = \frac{45}{60}$ ;  $\frac{4}{5} = \frac{48}{60}$

- a) 0,5 b) 0,25

c) 0,125 d) 0,75

e) 0,55 f) 0,8

g) 0,625 h) 0,875

i) 0,66 j) 0,36

12.3  $(1 \div 4) + 3 = 3,25$

12.4  $0,3333333$

- a)  $0,6666666$

b)  $0,4545454$

12.6 a)  $0, \dot{6}$

b)  $0, \dot{4}\dot{5}$

- a)  $0,667$

b)  $0,455$

## LEARNER SECTION

### Content

**ACTIVITY: Fractions [LO 1.9.2, LO 1.10, LO 1.4]**

**10. BRAIN-TEASER!**

In a competition, Abdul’s dolphin jumps  $\frac{2}{3}$  of a metre out of the water. Fatima’s dolphin jumps  $\frac{3}{4}$  of a metre out of the water, while Nazir’s dolphin jumps  $\frac{4}{5}$  of a metre out of the water. Whose dolphin jumps the highest?

**11.1 Did you know?**

To convert common fractions to decimal fractions we make use of equivalent fractions.

e.g.	<table><tr><td>1</td><td>×</td><td>2</td></tr><tr><td>5</td><td>×</td><td>2</td></tr></table>	1	×	2	5	×	2	=	<table><tr><td>2</td></tr><tr><td>10</td></tr></table>	2	10	= 0,2
1	×	2										
5	×	2										
2												
10												

**11. 2 Convert the following fractions to decimal fractions:**

a)	$\frac{1}{2}$	_____	b)	$\frac{1}{4}$	_____
c)	$\frac{1}{8}$	_____	d)	$\frac{3}{4}$	_____
e)	$\frac{11}{20}$	_____	f)	$\frac{4}{5}$	_____
g)	$\frac{5}{8}$	_____	h)	$\frac{7}{8}$	_____
i)	$\frac{33}{50}$	_____	j)	$\frac{9}{25}$	_____

12. Do you still remember?

If we want to check the above with a calculator, e.g. , we key in:  $7 \div 8 =$

12.2 Check the exercise above (11.2) with your calculator.

12.3 How would you convert 3 and a quarter to a decimal fraction using your calculator?

---



---

12.4 What will  $\frac{1}{3}$  look like on a calculator?

Key in  $1 \div 3 =$  and write the answer down: \_\_\_\_\_

Did you know?

We call a fraction like 0,333333333333 a recurring decimal fraction,

and we write it like this:  $0, \circ$

12.5

a) What will two thirds (  $\frac{2}{3}$  ) look like on the calculator?

---

b) What will five elevenths (  $\frac{5}{11}$  ) look like on the calculator?

---

12.6

Write the above now in the short way:

a) \_\_\_\_\_

b) \_\_\_\_\_

12.7

Round off your answers to 3 decimal places:

a) \_\_\_\_\_

b) \_\_\_\_\_

### 13. TIME FOR SELF-ASSESSMENT

- Colour in the applicable block for each of the following:

I know what rational numbers are	1	2	3
I know an example for a:			
proper fraction	1	2	3
improper fraction	1	2	3
mixed number	1	2	3
I know how to form equivalent fractions	1	2	3
I can convert fractions to decimal fractions	1	2	3
I know how to key in fractions on a calculator	1	2	3
I know how to show a recurring decimal	1	2	3

### Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

***Assessment Standard 1.9:*** We know this when the learner uses a range of techniques to perform calculations including:

1.9.2: using a calculator;

1.10: uses a range of strategies to check solutions and judges the reasonableness of solutions;

***Assessment Standard 1.4:*** We know this when the learner recognises and uses equivalent forms of the rational numbers listed above.

## MATHEMATICS

### Common fractions

## EDUCATOR SECTION

### Memorandum

14. a) denominator

b) common denominator

c) multiple

d) tellers

e) number

f) fractions

g) improper fractions

h) simplify

15.2 a)

$$= \frac{12}{21} + \frac{14}{21}$$

$$= \frac{26}{21}$$

$$= 1 \frac{5}{21}$$

b)

$$= \frac{5}{10} + \frac{6}{10}$$

$$= \frac{11}{10}$$

$$= 1 \frac{1}{10}$$

c)

$$= \frac{36}{45} - \frac{25}{45}$$

$$= \frac{11}{45}$$

d)

$$= \frac{4}{6} - \frac{3}{6}$$

$$= \frac{1}{6}$$

16.

a)

$$= 11\frac{2}{3} + \frac{1}{7}$$

$$= 11\frac{14}{21} + \frac{3}{21}$$

$$p = 11\frac{17}{21}$$

b)

$$= 3\frac{1}{4} - \frac{1}{9}$$

$$= 3\frac{9}{36} - \frac{4}{36}$$

$$t = 3\frac{5}{36}$$

$$= 6\frac{3}{4} - (3\frac{1}{2} + 1\frac{2}{3})$$

$$= 6\frac{3}{4} - 3\frac{3}{6} + \frac{4}{6}$$

$$= 6\frac{3}{4} - 4\frac{1}{6}$$

$$= 2\frac{9}{12} - \frac{2}{12}$$

$$g = 2\frac{7}{12}$$

d)

$$= 9\frac{7}{8} - (4\frac{9}{12} + \frac{8}{12})$$

$$= 9\frac{7}{8} - 5\frac{5}{12}$$

$$= 4\frac{7}{8} - \frac{5}{12}$$

$$= 4\frac{21}{24} - \frac{10}{24}$$

$$v = 4\frac{11}{24}$$

## LEANER SECTION

### Content

#### ACTIVITY: Addition and subtraction of fractions [LO 1.7.3]

14. Addition and subtraction of fractions

LET US REVISE.

The answers to the following questions are hidden below.

Circle them when you find them and then complete the sentences.

a	b	t	t	t	s	o	n	k	o	f	m	n
d	e	n	o	m	i	n	a	t	o	r	y	u
e	d	e	l	u	o	a	e	n	r	a	j	m
n	k	l	l	l	e	a	m	d	o	c	p	e
o	h	a	e	t	m	l	e	i	n	t	o	r
m	m	v	r	i	e	d	r	g	e	i	o	a
i	n	i	s	p	r	f	e	s	g	o	g	t
n	s	u	x	l	m	g	p	t	t	n	h	o
a	e	q	k	e	l	v	o	l	e	s	t	r
t	d	e	f	s	h	j	r	k	l	e	e	s
o	q	w	e	r	t	y	p	y	o	l	u	h
r	s	d	a	z	d	o	m	u	b	g	e	s
s	i	m	p	l	i	f	i	e	d	e	l	h

- a) We can only add or subtract fractions if the..... are the same.
- b) If the denominators differ, we must find ..... fractions with the same denominators.
- c) We can find the common denominator easily by using .....
- d) We only add the..... together.
- e) The ..... stays unchanged when we add or subtract.
- f) When we add mixed numbers together, we first add the natural numbers and then the .....
- g) When we subtract mixed numbers, we can first change them to ..... fractions.
- h) Answers must always be ..... as far as possible.

#### 15.1 Do you still remember?

When we add or subtract e.g. one third ( $\frac{1}{3}$ ) + four fifths ( $\frac{4}{5}$ ) or five sixths ( $\frac{5}{6}$ ) – two ninths ( $\frac{2}{9}$ ) we must first make the DENOMINATORS the same. To do this we must look for the **Lowest Common Multiple (LCM)**.

If we want the LCM of 3 and 5 we can work as follows:

3: 3 ; 6 ; 9 ; 12 ; 15 ; 18 ; 21 ; etc.

5: 5 ; 10 ; 15 ; 20 ; 25 ; etc.



Thus we change both denominators to 15:	<table><tr><td>1</td><td>×</td><td>5</td></tr><tr><td>3</td><td>×</td><td>5</td></tr></table>	1	×	5	3	×	5	=	<table><tr><td>5</td></tr><tr><td>15</td></tr></table>	5	15	en	<table><tr><td>4</td><td>×</td><td>3</td></tr><tr><td>5</td><td>×</td><td>3</td></tr></table>	4	×	3	5	×	3	=	<table><tr><td>12</td></tr><tr><td>15</td></tr></table>	12	15
1	×	5																					
3	×	5																					
5																							
15																							
4	×	3																					
5	×	3																					
12																							
15																							

Thus:

$$\frac{1}{3} + \frac{4}{5}$$

$$\frac{5}{15} + \frac{12}{15}$$

$$\frac{17}{15}$$

$$1\frac{2}{15}$$

15.2 Calculate the following:

a)  $x = \frac{4}{7} + \frac{2}{3}$

---

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b)  $y = \frac{1}{2} + \frac{3}{5}$

---

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c)  $d = \frac{4}{5} - \frac{5}{9}$

---

---

---

---

d)  $k = \frac{2}{3} - \frac{1}{2}$

---

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16. Work together with a friend and calculate:

a)  $p = 7\frac{2}{3} + 4\frac{1}{7}$

---

---

---

---

b)  $t = 5\frac{1}{4} - 2\frac{1}{9}$

---

---

---

---

c)  $g = 6\frac{3}{4} - (2\frac{1}{2} + 1\frac{2}{3})$

---

---

---

---

d)  $v = 9\frac{7}{8} - (3\frac{3}{4} + 1\frac{2}{3})$

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17. CHALLENGE!

Divide into groups of three. Complete the following table by filling in the number of hours you spent doing homework last week:

	NAME	Mon	Tues	Wed	Thur	Fri
e.g	Nomsa	$1\frac{1}{2}$	$2\frac{1}{4}$	$3\frac{3}{4}$	$1\frac{1}{2}$	$\frac{1}{2}$

1.	.....	.....	.....	.....	.....	.....
2.	.....	.....	.....	.....	.....	.....
3.	.....	.....	.....	.....	.....	.....

Answer the following questions:

a) How many hours did each member of the group spend on homework last week?

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

b) Who spent the most time on homework? \_\_\_\_\_

c) Who learnt the least? \_\_\_\_\_

d) Calculate the difference between b en c's answers.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

e) Ask another group to check your answers.

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

1.7.3: addition, subtraction and multiplication of common fractions.

MATHEMATICS

Common fractions

EDUCATOR SECTION

Memorandum

18.1

ADDITION

$$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$$

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$$

$$\frac{3}{7} + \frac{3}{7}$$

$$\frac{2}{3} + \frac{2}{3} + \frac{2}{3}$$

$$\frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5}$$

PRODUCT

$$2 \frac{1}{2}$$

$$1 \frac{1}{2}$$

**Equation:**

$$\frac{6}{7}$$

2

$$1 \frac{3}{5}$$

b) numerators x numerators

denominators x denominators

d)

$$(i) \frac{21}{10}$$

$$= 2 \frac{1}{10}$$

$$(ii) \frac{12}{3}$$

$$= 4$$

$$(iii) \frac{84}{9}$$

$$= 9 \frac{1}{3}$$

$$18.2 \ 3 \ 1 \ 2 \ 8$$

$$a. (i) \underline{15} \times \underline{4} \ (ii) \underline{18} \times \underline{40}$$

$$8 \ 5 \ 25 \ 27$$

$$2 \ 1 \ 5 \ 3$$

$$k = \frac{3}{2} = 1 \frac{1}{2} \ c = \frac{16}{15} = 1 \frac{1}{15}$$

$$7 \ 4 \ 3$$

$$18.3 \ b) (i) = \underline{38} \times \underline{16} \ (ii) = \underline{17} \times \underline{9}$$

$$4 \ 5 \ 3 \ 10$$

$$m = 28 \ n = \frac{51}{10}$$

$$n = 5 \frac{1}{10}$$

$$6$$

$$(iii) = \underline{18} \times \underline{8}$$

$$5 \ 3$$

$$1$$

$$= \frac{48}{5}$$

$$p = 9 \frac{3}{5}$$

19.1

a) 1

b) 1

c) 1

d) 1

19.2 **Product is 1 every time**

$$19.4 \text{ a) } \frac{20}{17}$$

$$\text{b) } \frac{1}{40}$$

$$\text{c) } \frac{5}{31}$$

$$\text{d) } \frac{8}{73}$$

$$19.5 \text{ c) } \frac{5}{31} : \text{First make an improper fraction ( } \frac{31}{5} \text{ )}$$

$$\text{d) } \frac{8}{73} : \text{First make an improper fraction ( } \frac{73}{8} \text{ )}$$

$$20. \text{ a) } 1 \frac{2}{3} \times \frac{1}{2}$$

$$= \frac{5}{3} \times \frac{1}{2}$$

$$= \frac{5}{6} \text{ m} = 83, \dot{3} \text{ cm}$$

$$\text{b) } \frac{5}{6} \times \frac{1}{3} = \frac{5}{18} \text{ m}$$

$$= 27, \dot{7} \text{ cm}$$

22.

(a) 32

(b) 15

- (c) 25
- (d) 25
- (e) 45
- (f) 2
- (g) 8
- (h) 7
- (i) 7
- (j) 6
- (k) 6
- (l) 8
- (m) 8
- (n) 8
- (o) 100

## **LEARNER SECTION**

### **Content**

#### **ACTIVITY: Multiplication of fractions [LO 1.7.3, LO 2.1.5]**

#### **18. MULTIPLICATION OF FRACTIONS**

##### **18.1 Multiplication of fractions with natural numbers**

You already know that multiplication is repeated addition.

a) See if you can complete the following table:

	SUM	SKETCH	REPEATED ADDITION	PRODUCT
e.g.	$5 \times \frac{1}{2}$		$\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$	$2\frac{1}{2}$
	$6 \times \frac{1}{4}$		.....	.....
	$2 \times \frac{3}{7}$		.....	.....
	$3 \times \frac{2}{3}$		.....	.....
	$4 \times \frac{2}{5}$		.....	.....

b) Look carefully at the completed table. Can you think of a shorter way/method to find the answers?

.....

.....

.....

c) TAKE NOTE!

You could also follow this method:

1. Write both numbers as fractions e.g.  $6 \times \frac{1}{4} = \frac{6}{1} \times \frac{1}{4}$

2. Multiply the numerators:  $6 \times 1 = 6$

3. Multiply the denominators:  $1 \times 4 = 4$

4. Simplify the answer:  $\frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2}$

d) Calculate:

(i)  $7 \times \frac{3}{10}$



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(ii)  $\frac{2}{3} \times 6$

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(iii)  $12 \times \frac{7}{9}$

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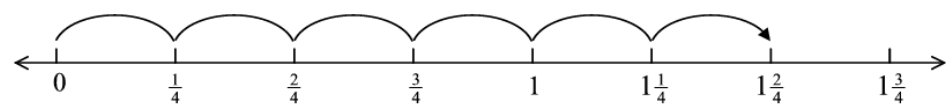


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e) We would represent  $6 \times \frac{1}{4}$  in another way using a number line:

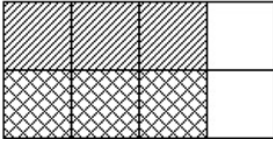


f) Represent the following on a number line:  $x = 4 \times \frac{2}{3}$

### 18.2 Multiplying fractions with fractions

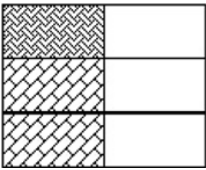
a) Look carefully at the following examples:

(i) Half ( $\frac{1}{2}$ ) of three quarters ( $\frac{3}{4}$ ) can be shown like this:



Thus:  $\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$

(ii) One third ( $\frac{1}{3}$ ) of a half ( $\frac{1}{2}$ ) looks like this:



Thus  $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$

b) Make your own similar sketches for:

(i)  $\frac{1}{5} \times \frac{1}{2}$

(ii)  $\frac{3}{10} \times \frac{1}{2}$

c) **IMPORTANT!**

When multiplying a fraction by a fraction, e.g.  $\frac{2}{3} \times \frac{3}{8}$

1. We first multiply the numerators together:  $2 \times 3 = 6$

2. Then we multiply the denominators together:  $3 \times 8 = 24$

3. We also simplify where possible:  $\frac{6 \div 6}{24 \div 6} = \frac{1}{4}$

d) Do you still remember?

To simplify you must always divide the numerator and denominator by the same number.

e) Did you know?

We can make use of cancelling to determine the product.

This entails dividing the numerator and denominator by a common factor.

e.g.	<table><tr><td>25</td><td>×</td><td>40</td></tr><tr><td>30</td><td>×</td><td>48</td></tr></table>	25	×	40	30	×	48	=	<table><tr><td><sup>1</sup>5 × 5</td></tr><tr><td><sub>1</sub>5 × 6</td></tr></table>	<sup>1</sup> 5 × 5	<sub>1</sub> 5 × 6	×	<table><tr><td>5 × 8<sup>1</sup></td></tr><tr><td>6 × 8<sub>1</sub></td></tr></table>	5 × 8 <sup>1</sup>	6 × 8 <sub>1</sub>
25	×	40													
30	×	48													
<sup>1</sup> 5 × 5															
<sub>1</sub> 5 × 6															
5 × 8 <sup>1</sup>															
6 × 8 <sub>1</sub>															

	<table><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>							=	<table><tr><td>25</td></tr><tr><td>36</td></tr></table>	25	36
25											
36											

A shorter way looks like this:

	<table><tr><td></td><td>25</td></tr><tr><td></td><td></td></tr></table>		25			×	<table><tr><td>40</td><td>4 1</td></tr><tr><td></td><td></td></tr></table>	40	4 1			=	<table><tr><td>25</td></tr><tr><td></td></tr></table>	25	
	25														
40	4 1														
25															

	3	30		48	12		$3 \times 12$
--	---	----	--	----	----	--	---------------

				=	25
					36

We can make use of cross-over and vertical cancelling.

f) Calculate the following by making use of cancelling:

(i)  $k = \frac{15}{8} \times \frac{4}{5}$

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(ii)  $c = \frac{18}{25} \times \frac{40}{27}$

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### 18.3 Multiplication of mixed numbers

a) TAKE NOTE!

We must first convert the mixed number to an improper fraction and then multiply.

$$6 \times 1\frac{3}{4} = \frac{6}{1} \times \frac{7}{4}$$

*e.g.*

$$10\frac{2}{4}$$
$$10\frac{1}{2}$$

Remember: Always simplify your answer!

b) Calculate the following and simplify where possible:

(i)  $m = 8\frac{3}{4} \times \frac{16}{5}$

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(ii)  $n = 5\frac{2}{3} \times \frac{9}{10}$

---

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---

(iii)  $p = 3\frac{3}{5} \times 2\frac{2}{3}$

---

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---

19.1 Can you also calculate the answers of the following?

a)  $h = \frac{3}{4} \times \frac{4}{3}$

---

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b)  $f = \frac{7}{9} \times \frac{9}{7}$

---

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---

c)  $e = \frac{8}{9} \times \frac{9}{8}$

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---

d)  $b = \frac{12}{15} \times \frac{15}{12}$

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19.2 What do you notice when you compare the answers of 19.1?

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### 19.3 Did you know?

If the product of two fractions is 1, then one fraction is the **RECIPROCAL** of the other. Thus, to get the reciprocal of a fraction, we just swop the numerator and the denominator around!

### 19.4 Determine the reciprocal of each of the following:

a)  $\frac{17}{20} =$  \_\_\_\_\_

b)  $40 =$  \_\_\_\_\_

c)  $6\frac{1}{5} =$  \_\_\_\_\_

d)  $9\frac{1}{8} =$  \_\_\_\_\_

19.5 Explain to a friend how you got c and d's answers. First write your answers down here.

---

---

### 20. BRAIN-TEASER!

Jodi is  $1\frac{2}{3}$  metre tall. Sandy is half her length. Grace is  $\frac{1}{3}$  of Sandy's length.

a) How tall is Sandy?

---

---

b) How tall is Grace?

---

---

### 21. Time for self-assessment

• Tick the applicable block:	YES	NO
I can add fractions correctly		
I can find the lowest common multiple of two denominators.		
I can subtract fractions correctly		
I can multiply fractions with natural numbers		
I can multiply fractions with fractions		
I can multiply fractions with mixed numbers		
I know how to use cancelling when I multiply		
I know how to simplify		
I can determine the reciprocal of a fraction		

22. Let us see how quickly you can think! See if you can complete the following mental test in 2 minutes:

a) $17 + 15 = \dots\dots\dots$	i) $\frac{1}{10}$ of 70 = $\dots\dots\dots$
b) $27 + \dots\dots\dots = 42$	j) $\frac{1}{10}$ of 1 minute is $\dots\dots\dots$ seconds
c) $52 - 27 = \dots\dots\dots$	k) $\frac{1}{4}$ of a day = $\dots\dots\dots$ hours
d) $72 - 47 = \dots\dots\dots$	l) $56 \div 7 = \dots\dots\dots$
e) $82 - 37 = \dots\dots\dots$	m) $72 \div 9 = \dots\dots\dots$
	n) $48 \div 6 = \dots\dots\dots$



f) $10 \times \frac{1}{5} = \dots\dots\dots$	
g) $\frac{1}{4}$ of 32 = $\dots\dots\dots$	o) $10^4 \div 10^2 = \dots\dots\dots$
h) $\frac{1}{8}$ of 56 = $\dots\dots\dots$	

(15)

- Colour in:

My achievement 

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

1.7.3: addition, subtraction and multiplication of common fractions.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.1:** We know this when the learner investigates and extends numeric and geometric patterns looking for a relationship or rules, including patterns:

2.1.5: represented in tables.

Fractions - 09

## MATHEMATICS

### Common fractions

## EDUCATOR SECTION

### Memorandum

24.1 ( )

or

x

+

—

$$\begin{aligned} & \bullet \text{ (i)} = \frac{7}{2} \times \frac{30}{7} - 10 \\ & = \frac{210}{14} - 10 \\ & = 15 - 10 \end{aligned}$$

$$s = 5$$

$$\text{i.} = 32 - 11 \frac{3}{4}$$

$$v = 20 \frac{1}{4}$$

$$\begin{aligned} \text{i.} & = \frac{23}{4} \times \frac{4}{7} \\ & = \frac{23}{7} \end{aligned}$$

$$p = 3 \frac{2}{7}$$

26. a) Method: Cancel out

Answer:  $\frac{1}{8}$

b)  $\frac{1}{25}$

## LEANER SECTION

### Content

#### ACTIVITY: Mixed calculations [LO 1.10]

#### 24. MIXED CALCULATIONS

24.1 Do you still remember?

- Write down the order of operations below:

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---

---

---

24.2 Now apply this to the following:

(i)  $s = 3\frac{1}{2} \times 4\frac{2}{7} - \frac{2}{3}$  of 15

---

---

---

---

(ii)  $v = \frac{1}{2}$  of  $64 - 7\frac{1}{2} + 4\frac{1}{4}$

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---

(iii)  $p = 5\frac{3}{4} \div 3\frac{1}{8} - 1\frac{3}{4}$

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25. Time for self-assessment

Tick the applicable block:			
I can divide whole numbers by fractions			
I can divide fractions by fractions			
I can divide with mixed numbers			
I know the order of operations			
I can apply the order of operations when I solve problems with mixed operations			

26. BRAIN-TEASERS!

a) What is the answer of the following? Try and solve it without long calculations!

$$o = 1 - \frac{1}{2} \times 1 - \frac{1}{3} \times 1 - \frac{1}{4} \times 1 - \frac{1}{5} \times 1 - \frac{1}{6} \times 1 - \frac{1}{7} \times 1 - \frac{1}{8}$$

---



---

b) If you continue with the pattern to . . .  $1 - \frac{1}{25}$  , what will the answer be then?

---

---

## Assessment

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.10: We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

Fractions - 09

## MATHEMATICS

### Common fractions

## EDUCATOR SECTION

### Memorandum

24.1 ( )

or

x

+

—

$$\begin{aligned} & \bullet \text{ (i)} = \frac{7}{2} \times \frac{30}{7} - 10 \\ & = \frac{210}{14} - 10 \\ & = 15 - 10 \end{aligned}$$

$$s = 5$$

$$\text{i.} = 32 - 11 \frac{3}{4}$$

$$v = 20 \frac{1}{4}$$

$$\begin{aligned} \text{i.} & = \frac{23}{4} \times \frac{4}{7} \\ & = \frac{23}{7} \end{aligned}$$

$$p = 3 \frac{2}{7}$$

26. a) Method: Cancel out

Answer:  $\frac{1}{8}$

b)  $\frac{1}{25}$

## LEANER SECTION

### Content

#### ACTIVITY: Mixed calculations [LO 1.10]

#### 24. MIXED CALCULATIONS

24.1 Do you still remember?

- Write down the order of operations below:

---

---

---

---

24.2 Now apply this to the following:

(i)  $= 3\frac{1}{2} \times 4\frac{2}{7} - \frac{2}{3}$  of 15

---

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---

---

(ii)  $= \frac{1}{2}$  of 64  $- 7\frac{1}{2} + 4\frac{1}{4}$

---

---



---



---

(iii)  $= 5\frac{3}{4} \div 3\frac{1}{8} - 1\frac{3}{4}$

---



---






---



---

25. Time for self-assessment

Tick the applicable block:			
I can divide whole numbers by fractions			
I can divide fractions by fractions			
I can divide with mixed numbers			
I know the order of operations			
I can apply the order of operations when I solve problems with mixed operations			

26. BRAIN-TEASERS!

a) What is the answer of the following? Try and solve it without long calculations!

$$= 1 - \frac{1}{2} \times 1 - \frac{1}{3} \times 1 - \frac{1}{4} \times 1 - \frac{1}{5} \times 1 - \frac{1}{6} \times 1 - \frac{1}{7} \times 1 - \frac{1}{8}$$

---



---



b) If you continue with the pattern to . . .  $1 - \frac{1}{25}$  , what will the answer be then?

---

---

## **Assessment**

Learning Outcome 1: The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

Assessment Standard 1.10: We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

Decimal fractions

## **MATHEMATICS**

### **Decimal Fractions**

## **EDUCATOR SECTION**

### **Memorandum**

2.

Temperature Swimmers

Volume Athletes

Measurement Odometer

Distance Scientists

Scales Engineers

Money

3.1 a)  $\frac{6}{100}$

b)  $\frac{2}{1000}$

c) 200

d)  $\frac{2}{10}$

e) 80

f)  $\frac{9}{1000}$

g) 2 000

h)  $\frac{8}{100}$

i)  $\frac{5}{10}$

j)  $\frac{8}{1000}$

• a)  $\frac{9}{10}$

b)  $\frac{3}{10} \frac{8}{100}$

c)  $\frac{8}{10} \frac{2}{100} \frac{4}{1000}$

d)  $\frac{3}{10} \frac{8}{1000}$

5. a) 0,12; 0,18; 0,24; 0,3; 0,36;

0,42; 0,48; 0,54; 0,6; 0,66

b) 0,018; 0,027; 0,036; 0,045;

0,054; 0,063; 0,072; 0,081; 0,09

c) 7,4; 11,1; 14,8; 18,5;

22,2; 25,9; 29,6; 33,3; 37

6. a) 0,8; 1,0; 1,2; 1,4

b) 5,5; 5; 4,5; 4

c) 0,989; 0,986; 0,983;

0,98; 0,977

d) 0,016; 0,02; 0,024;

0,028; 0,032

7. +20 +100 +0,003

+0,3

+0,07 +0,13 +0,05

+0,3

+0,007 +0,12 +0,009

8. a) 1,0

b) 3,2

c) 0,75

d) 4,2

e) 1,4

f) 2,9

g) 3,15

h) 3,42

i) 0,05

j) 4,5

k) 3,98

l) 1,02

m) 2,5

n) 15,6

o) 11,4

Leaner Section

## Content

### ACTIVITY: Decimal fractions [LO 1.1.1, LO 1.3.2, LO 1.7.4, LO 1.10]

#### 1. Did you know?

The decimal system was developed about 500 AD by the Hindu's in India. Johannes Kepler, a mathematician in The Netherlands, used the decimal comma for the first time in the early 1600's. Prior to this, mathematicians used circles or bars to show the decimal comma. John Napier, a Scot, was the first to use the decimal point in 1617. Today England and the USA still use a decimal point instead of a comma.

#### 2. Do you still remember?

Divide into groups of four. Make a list of where we use decimal fractions in our everyday lives.

#### 3. Let us revise

$$1\,438,576 = 1\,000 + 400 + 30 + 8 + \frac{5}{10} + \frac{7}{100} + \frac{6}{1000}$$

3.1 Write down the value of the underlined digit in each number below:

a) 532,168 .....

b) 326,432 .....

c) 291,567 .....

d) 460,231 .....

e) 886,434 .....

f) 1 467,239 .....

g) 2 321,456 .....

h) 3 641,985 .....

i) 2 634,527 .....

j) 8 139,438 .....

3.2 Complete the following:

e.g..  $5,3 = 5 + \frac{3}{10}$

a)  $6,9 = 6 + \dots$

b)  $26,38 = 26 + \dots + \dots$

c)  $9,824 = 9 + \dots + \dots + \dots$

d)  $16,308 = 16 + \dots + \dots$

4. Work together with a friend. Take turns to count aloud:

a) 3,8 ; 3,9 ; 4 ; 4,1 ; ... to 8

b) 14 ; 13,5 ; 13 ; 12,5 ; ... to 6

c) 2,4 ; 2,6 ; 2,8 ; ... to 7

d) 18,8 ; 18,6 ; 18,4 ; to 10

5. Can you still remember?

If we want to add the same number continuously, e.g. 0,01 (one hundredth), we programme the calculator in this way :  $0,01 + + = = =$

a) Programme your calculator to add on 0,06 each time and complete:

0,06 ; ..... ; ..... ; ..... ; ..... ; ..... ;  
..... ; ..... ; ..... ; ..... ; .....

b) Add on 0,009 each time (programme your calculator)

0,009 ; ..... ; ..... ; ..... ; ..... ;  
..... ; ..... ; ..... ; ..... ; .....

c) Add on 3,7 each time with the help of you calculator:

3,7 ; ..... ; ..... ; ..... ; ..... ;  
..... ; ..... ; ..... ; ..... ; .....

6. Complete the following WITHOUT a calculator:

a) 0,2 ; 0,4 ; 0,6 ; ..... ; ..... ; ..... ; .....

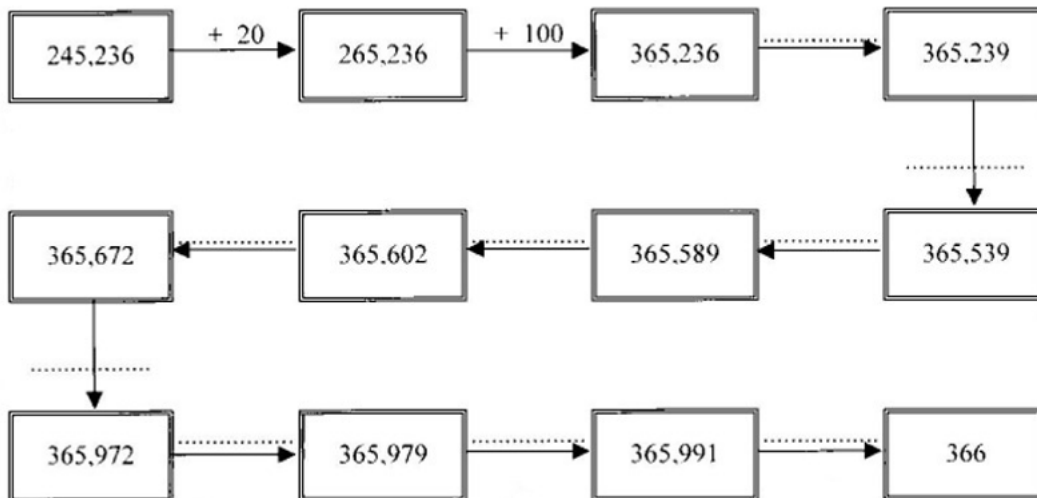
b) 7 ; 6,5 ; 6 ; ..... ; ..... ; ..... ; .....

c) 0,998 ; 0,995 ; 0,992 ; ..... ; ..... ; ..... ;..... ; .....

d) 0,004 ; 0,008 ; 0,012 ; ..... ; ..... ; ..... ;..... ; .....

7. BRAIN-TEASER!

Complete the following flow diagram. (You may use your calculator).



8. Let us see how well you do in the first mental test. Write down only the answers:

a)  $0,7 + 0,3 = \dots\dots\dots$

b)  $2,4 + 0,8 = \dots\dots\dots$

c)  $0,35 + 0,4 = \dots\dots\dots$

d)  $5 - 0,8 = \dots\dots\dots$

e)  $0,8 + 0,6 = \dots\dots\dots$

f)  $3,4 - 0,5 = \dots\dots\dots$

g)  $3,45 - 0,3 = \dots\dots\dots$

h)  $3,45 - 0,03 = \dots\dots\dots$

i)  $2,45 - 2,4 = \dots\dots\dots$

j)  $2,45 + 2,05 = \dots\dots\dots$

k)  $4 - 0,02 = \dots\dots\dots$

l)  $0,38 + 0,64 = \dots\dots\dots$



m)  $1,25 + 1,25 = \dots\dots\dots$

























n)  $6,9 + 8,7 = \dots\dots\dots$

o)  $15 - 3,6 = \dots\dots\dots$

(15)

## 9. Time for self-assessment

▪ Colour in the face that is true of you ability:

I can name a few examples where we use decimal fractions in our everyday lives				
I can say what the values of underlined digits in numbers are				
I can complete number patterns by counting forwards and backwards without a calculator				
I can complete number patterns by counting forwards and backwards with a calculator				
I can correctly programme my calculator to count in decimal intervals				
I did well in my mental test				

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.1** We know this when the learner counts forwards and backwards in the following ways:

1.1.1 in decimal intervals;

**Assessment Standard 1.3** We know this when the learner recognises, classifies and presents the following numbers in order to describe and compare them:

1.3.2 decimal (to at least three decimal places), fractions and percentages;

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

1.7.4 addition, subtraction and multiplication of positive decimals to at least 2 decimal places;

**Assessment Standard 1.10:** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

Logical sequence and comparison of decimal fractions

## **MATHEMATICS**

### **Decimal Fractions**

#### **EDUCATOR SECTION**

##### **Memorandum**

10.1 1 2

1. 5

1. 8

2. 3

6 7

7 4

1. 1

5 6

10.3 a) <

b) >

c) <

d) =

e) <

f) >

Leaner Section

## Content

**ACTIVITY: Logical sequence and comparison of decimal fractions [LO 1.3.2, LO 2.3.3, LO 5.7]**

### 10. LOGICAL SEQUENCE AND COMPARISON OF DECIMAL FRACTIONS

10.1 Work together with a friend and compare the results of the following athletes.

Put the athletes in order from the winner to the last place.

Name	Long Jump	Position	High Jump	Position
Alec	6,1 m	.....	1,63 m	.....
Dimitri	4,85 m	.....	1,5 m	.....
Owen	5,9 m	.....	1,11 m	.....
Tembo	5,32 m	.....	1,6 m	.....
Vera	5,09 m	.....	1,23 m	.....
Cindy	4,9 m	.....	1,57 m	.....
Sonia	6,04 m	.....	1,7 m	.....
Gloria	5,21 m	.....	1,34 m	.....

10.2 a) Find the following statistics of five of your class mates and complete the table:

	Name	Height	Mass
1.	.....	.....	.....
2.	.....	.....	.....
3.	.....	.....	.....
4.	.....	.....	.....
5.	.....	.....	.....

b) Arrange names of your friends from the shortest to the tallest:

- 1. ....
- 2. ....
- 3. ....
- 4. ....
- 5. ....

c) Now arrange names of your friends from the heaviest to the lightest:

- 1. ....
- 2. ....
- 3. ....

4. ....

5. ....

10.3 Fill in:  $<$  ;  $>$  or  $=$  :

a) 0,63 ..... 0,7

b) 0,4 ..... 0,39

c) 32,068 ..... 32,102

d) 1,27 ..... 1,270

e) 0,007 ..... 0,07

f) 4,44 ..... 4,044

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.3:** We know this when the learner recognises, classifies and presents the following numbers in order to describe and compare them:

1.3.2 decimal (to at least three decimal places), fractions and percentages;

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in a variety of ways using:

2.3.3 tables.

**Learning Outcome 5:** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

**Assessment Standard 5.7:** We know this when the learner identifies the largest and smallest scores in a data set and determines the difference between them in order to determine the spread of the data (range).

Decimal fractions and rounding off

## MATHEMATICS

### Decimal Fractions

#### EDUCATOR SECTION

##### Memorandum

- a) 41c

a.  $42 \frac{1}{2}$

b. 44c

- Rounding off

11.3.1 a) Look at the 2<sup>nd</sup> digit after comma (100ths)

If 5, 6, 7, 8, 9: 10ths – digit 1 more

If 4, 3, 2, 1, 0: 10ths – digits remains the same

Replace everything after 10ths with noughts

- a. Look at 3<sup>rd</sup> digit after comma

If 5, 6, 7, 8, 9: 100ths – digit 1 more

If 4, 3, 2, 1, 0: 100ths – digit remains the same

Replace everything after 100ths with noughts

- a. Look at 4<sup>th</sup> digit after comma

If 5, 6, 7, 8, 9: Thousandths 1 more

If 4, 3, 2, 1, 0: Thousandths remain the same

Replace everything after 1 000ths with noughts

11.4 a) 4,5

9,9

5,3

7,6



52,6

88

11.4 b)

6,41	8,60	7,26	9,49	5,03	6,29

5,366

4,369

11.4 c) (i) (ii)

3,819

6,243

(iii) (iv)

2,597

7,480

- (vi)

12.2 a) 11

- a. R406
- b. 6
- c. 5
- d. R327
- e. 8
- f. 9
- g. 14
- h. 448
- i. 1 390

## Leaner Section

## Content

**ACTIVITY: Decimal fractions and rounding off [LO 1.4.2, LO 1.7.1]**

### 11.1 DECIMAL FRACTIONS AND ROUNDING OFF

Work together with a friend. Look at the sketches. What does one potato cost in each case?

a)

8 for R3,30

AARTAPPELS  
POTATOES

.....

.....

.....

.....

b)

8 for R3,40

AARTAPPELS  
POTATOES

.....

.....

.....

.....

c)

8 for R3,50

AARTAPPELS  
POTATOES

.....

.....

.....

.....

11.2 Round off the following to the nearest whole number. Write down the corresponding letter and see what word is hiding away.

B	D	E	F	G	I	K
39	149	7	236	38	6	17

L	M	N	O	R	S	T	U
237	15	35	16	8	150	3	4

- a) 8,047
- b) 15,51
- c) 3,7
- d) 35,236
- e) 149,089
- f) 6,4
- g) 35,09
- h) 38,456
- i) 15,912
- j) 236,199
- k) 235,89

What is your answer? .....

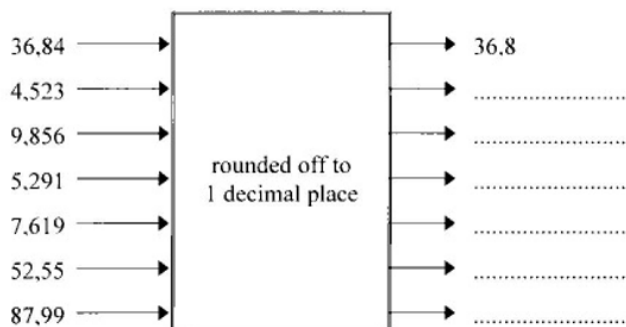
11.3.1 Work in groups of three. Formulate rules/methods for the following:

- a) Rounding off to one decimal place (tenths):
- b) Rounding off to two decimal places (hundredths):
- c) Rounding off to three decimal places (thousandths):

11.3.2 Compare your answers with those of the rest of the class.

11.4

- a) Complete the following flow diagram:



b) See if you can complete the table correctly:

Number	4,368	6,411	8,599	7,255	9,493	5,034	6,286
Rounded off to 2 decimal places	4,37	.....	.....	.....	.....	.....	.....

c) Round off the following to 3 decimal places. Draw a circle around the correct answer:

e.g. 6.4323 → 6.433  
                   → 6.434  
                   → 6.432

i) 4,3689 → 4,369  
               → 4,368  
               → 4,378

ii) 5,3655 → 5,365  
               → 5,366  
               → 5,375

iii) 6,2432 → 6,242  
               → 6,244  
               → 6,243

iv) 3,8194 → 3,820  
               → 3,819  
               → 3,818

v) 7,4796 → 7,479  
               → 7,480  
               → 7,489

vi) 2,5973 → 2,597  
               → 2,596  
               → 2,598

12.1 Do you still remember?

1 000 ml = 1 litre

1 000 g = 1 kg

1 000 kg = 1 tonne

1 000 litres = 1 k

1 000 m = 1 km

100 c = R1,00

12.2 Fill in the missing answers:

e.g. 3 521 mm to the nearest m = 4 m

a) 11 296 mm to the nearest m = ..... m

b) R406,38 to the nearest rand = R.....

c) 6 455 litre to the nearest kl = ..... kl

d) 4 823 kg to the nearest tonne = ..... t

e) 32 687 c to the nearest rand = R.....

f) 8 388 g to the nearest kg = ..... kg

g) 8 630 m to the nearest litre = ..... litres

h) 14 277 m to the nearest km = ..... km

i) R4,4839 to the nearest cent = ..... c

j) R13,9021 to the nearest cent = ..... c

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.4** We know this when the learner recognises and uses equivalent forms of the rational numbers listed above, including:

1.4.2 decimals;

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

1.7.1 rounding off numbers to at least one decimal place.

More revision

## MATHEMATICS

### Decimal Fractions

## EDUCATOR SECTION

### Memorandum

13.4

a)	$2 \frac{60}{100}$	2,60
b)	$13 \frac{625}{1000}$	13,625
c)	$17 \frac{75}{100}$	17,75
d)	$23 \frac{875}{1000}$	23,875
e)	$36 \frac{8}{10}$	36,8

13.5 a) 0,83

a. 0,2857142

b. 0,8125

c. 0,4

13.6

$\frac{9}{2}$	$\frac{11}{2}$	$\frac{325}{100}$	$\frac{43}{5}$	$\frac{201}{8}$	$\frac{4056}{1000}$	$\frac{199}{5}$
$4\frac{1}{2}$	$5\frac{1}{2}$	$3\frac{25}{100}$	$8\frac{3}{5}$	$25\frac{1}{8}$	$4\frac{56}{1000}$	$39\frac{4}{5}$
4,5	5,5	3,25	8,6	25,125	4,056	39,8

14. a) 0,3

a. 0,6

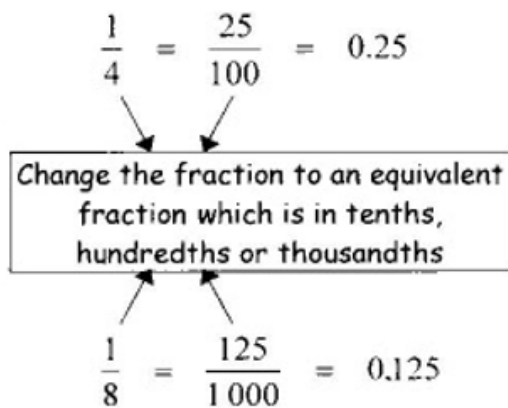
b. 0,23

## Leaner Section

## Content

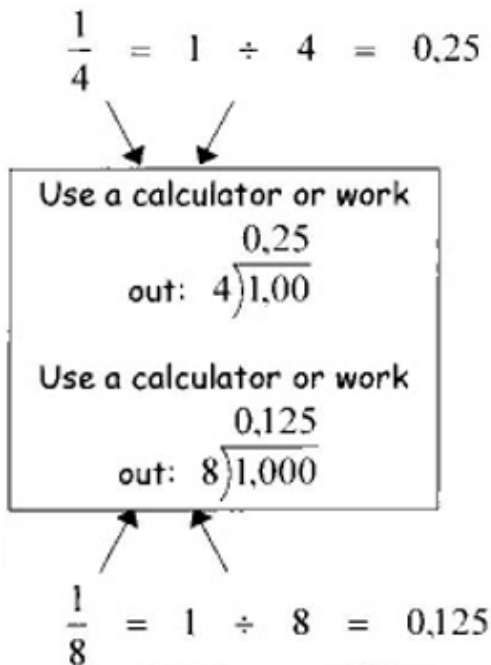
**ACTIVITY: More revision [LO 1.4.2, LO 1.10, LO 2.3.1, LO 2.3.3]**

We can convert proper fractions to decimal fractions in this way:



13.2 Did you know?

We can also calculate it in this way:



13.3 Which of the methods shown above do you choose?

Why?

13.4 Complete the following tables:

e.g.	$\frac{1}{4}$	$\frac{25}{100}$	0,25
a)	$2\frac{3}{5}$	$2\frac{\quad}{100}$	.....
b)	$13\frac{5}{8}$	$13\frac{\quad}{1000}$	.....
c)	$17\frac{3}{4}$	$17\frac{\quad}{100}$	.....
d)	$23\frac{7}{8}$	$23\frac{\quad}{1000}$	.....
e)	$36\frac{4}{5}$	$36\frac{\quad}{10}$	.....

13.5 Use the division method as shown in 13.2 and write the following fractions as decimal fractions:



a)  $\frac{5}{6}$  .....  
 .....

.....

b)  $\frac{2}{7}$  .....  
 .....

.....

c)  $\frac{13}{16}$  .....  
 .....

.....

d)  $\frac{4}{9}$  .....  
 .....

.....

13.6 Can you complete the following table??

Improper fraction	$\frac{9}{2}$			$\frac{45}{5}$			
Mixed Number		$5\frac{1}{2}$			$25\frac{1}{8}$		$39\frac{4}{5}$
Decimal fraction			3,25			4,056	

14. BRAIN-TEASERS!

Write the following fractions as decimal fractions. Try to do these sums first without a calculator!

a)  $\frac{1}{3}$  .....  
 .....  
 .....

b)  $\frac{2}{3}$  .....  
 .....  
 .....

c)  $\frac{23}{99}$  .....  
 .....  
 .....

15. Do you still remember?

We call 0,666666666 . . . a **recurring decimal**. We write it as 0,6.

0,454545 . . . is also a **recurring decimal** and we write it as 0,45.

We normally round off these recurring decimals to the first or second decimal place, e.g.: 0,6 becomes 0,7 or 0,67 and 0,45 becomes 0,5 or 0,45

16. Time for self-assessment

• Tick the applicable block:	YES	NO	
I can:			

Compare decimal fractions with each other and put them in the correct sequence.			
Fill in the correct relationship signs.			
Round off decimal fractions correctly to:			
<ul style="list-style-type: none"> <li>the nearest whole number</li> </ul>			
<ul style="list-style-type: none"> <li>one decimal place</li> </ul>			
<ul style="list-style-type: none"> <li>two decimal places</li> </ul>			
<ul style="list-style-type: none"> <li>three decimal places</li> </ul>			
Convert fractions and improper fractions correctly to decimal fractions.			
Explain what a recurring decimal is.			

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.4:** We know this when the learner recognises and uses equivalent forms of the rational numbers listed above, including:

1.4.2 decimals;

**Assessment Standard 1.10:** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in a variety of ways using:

2.3.1 verbal descriptions;

2.3.3 tables.

Adding and subtracting of decimal fractions

## **MATHEMATICS**

### **Decimal Fractions**

## **EDUCATOR SECTION**

### **Memorandum**

17.2 a) 999,955

- a. 802,383
- b. 115,749
- c. 420,799

18. 0,1818181

0,8181818

0,9999999

Above-mentioned are repetitive fractions

Rounded off, the answer is 1.

19.

- a) 1
- b) 3,3
- c) 0,67
- d) 4,3
- e) 6,4

f) 2,7

g) 3,4

h) 1,25

i) 1,05

j) 6,7

k) 2,98

l) 1,12

m) 5

n) 8,6

o) 8,2

Leaner Section

## **Content**

### **ACTIVITY: Adding and subtracting of decimal fractions [LO 1.7.4]**

#### **17. ADDING AND SUBTRACTING OF DECIMAL FRACTIONS:**

##### **17.1 Do you still remember?**

It is very easy to add and subtract decimal fractions. We do it in exactly the same way that we would add and subtract whole numbers.

Just be certain that you write:

- the tenths in the tenths column.
- the hundredths in the hundredths column.

- the thousandths in the thousandths column.

e.g.

	T	H	T	U		t	h	t
	4	2	6	8	,	7	9	8
+	3	6	1	3	,	5	3	2
	7	8	8	2	,	3	3	0

	T	H	T	U		t	h	t
	6	4	2	3	,	1	5	7
-	2	3	9	7	,	4	8	9
	4	0	2	5	,	6	6	8

17.2 Calculate:

a)  $n = 284,523 + 715,432$

b)  $d = 476,897 + 325,486$

c)  $k = 532,298 - 416,549$

d)  $b = 785,361 - 364,562$

18. BRAIN-TEASER!

- Write two elevenths as a decimal fraction. Then write nine elevenths as a decimal fraction. Add the two answers together.

.....  
 .....

.....  
 .....

- You already know that 2 elevenths plus 9 elevenths = 11 elevenths = one !
- How do you explain the above answer?

.....  
 .....

.....  
 .....

19. Let us see how you do in the following mental test.

a)  $0,6 + 0,4 = \dots\dots\dots$

b)  $2,4 + 0,9 = \dots\dots\dots$

c)  $0,27 + 0,4 = \dots\dots\dots$

d)  $5 - 0,7 = \dots\dots\dots$

e)  $3,8 + 2,6 = \dots\dots\dots$

f)  $3,2 - 0,5 = \dots\dots\dots$

g)  $3,45 - 0,05 = \dots\dots\dots$

h)  $3,45 - 2,2 = \dots\dots\dots$

i)  $3,45 - 2,4 = \dots\dots\dots$

j)  $2,65 + 4,05 = \dots\dots\dots$

k)  $4 - 1,02 = \dots\dots\dots$

l)  $0,39 + 0,73 = \dots\dots\dots$

m)  $3,25 + 1,75 = \dots\dots\dots$

n)  $4,9 + 3,7 = \dots\dots\dots$

o)  $12 - 3,8 = \dots\dots\dots$

- Complete by ticking the applicable block:

--	--	--



MYMARKS	<div data-bbox="544 191 841 283">IMPROVED</div> <div data-bbox="544 283 841 466">GOT THE SAME RESULT</div> <div data-bbox="544 466 841 606">DID WORSE</div>	when I compare my results with the results of the previous mental test.
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## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

1.7.4 addition, subtraction and multiplication of positive decimals to at least 2 decimal places.

Multiplication of decimal fractions

## MATHEMATICS

### Decimal Fractions

#### EDUCATOR SECTION

#### Memorandum

20.1

- a) 260
- b) 2 600
- c) 26,7
- d) 267
- e) 2 670
- f) 26,79
- g) 267,9
- h) 2 679

20.2 x10: Each digit moves 1 place left / comma moves 1 to the right.

x100: Each digit moves 2 places left / comma moves 2 to the right.

x1000: Each digit moves 3 places left / comma moves 3 to the right.

20.4

a)	54,8	548	5480
b)	3,67	36,7	367
c)	8,9	89	890
d)	165,38	1653,8	16 538

e)	282,51	2825,1	28 251
----	--------	--------	--------

20.5.1

a) 21,522

b) 46,215

c) 1,4

d) 4,64

e) 12 250

f) 2 370,6

- Answer is smaller.

x with number  $<1$

20.8

a) 0,4964

b) 1,3737

c) 0,109

d) 5,53724

e) 38,57997

f) 16,78164

23.1 10: Comma moves 1 place left

Each digit moves 1 place right

100: Comma moves 2 place left

Each digit moves 2 place right

1000: Comma moves 3 places left

Each digit moves 3 places right

23.3

8,21				0,729		0,6		
0,864		0,6254	0,0392		8,791		0,035	0,08
	74,68							

## Leaner Section

### Content

**ACTIVITY: Multiplication of decimal fractions [LO 1.3.4, LO 1.7.7, LO 1.9.2, LO 1.10, LO 2.3.3]**

#### 20. MULTIPLICATION OF DECIMAL FRACTIONS

##### 20.1 Let us revise

Do the following with the help of your calculator:

	SUM	ANSWER
e.g.	$2,6 \times 10$	26
a)	$2,6 \times 100$	.....
b)	$2,6 \times 1\,000$	.....
c)	$2,67 \times 10$	.....
d)	$2,67 \times 100$	.....
e)	$2,67 \times 1\,000$	.....
f)	$2,679 \times 10$	.....
g)	$2,679 \times 100$	.....
h)	$2,679 \times 1\,000$	.....

20.2 Work in groups of three. Quickly formulate rules for the multiplication of decimal fractions by 10, 100 and 1 000.

20.3 Do you still remember?

$10 \times 1 = 10 = 10^1$

$10 \times 10 = 100 = 10^2$

$10 \times 10 \times 10 = 1\,000 = 10^3$

$10 \times 10 \times 10 \times 10 = 10\,000 = 10^4$

$10 \times 10 \times 10 \times 10 \times 10 = 100\,000 = 10^5$

$10 \times 10 \times 10 \times 10 \times 10 \times 10 = 1\,000\,000 = 10^6$

20.4 Complete the following table:

	$\times$	$10^1$	$10^2$	$10^3$
e.g.	3,2	32	320	3 200
a)	5,48	.....	.....	.....
b)	0,367	.....	.....	.....
c)	0,89	.....	.....	.....
d)	16,538	.....	.....	.....
e)	28,251	.....	.....	.....

20.5 More revision

20.5.1 Work with a friend. Calculate the answers without using a calculator:

a)  $s = 3,587 \times 6$

.....  
.....  
.....  
.....

b)  $f = 9,243 \times 5$

.....  
.....  
.....  
.....

c)  $p = 0,02 \times 70$

.....  
.....  
.....  
.....

d)  $r = 0,058 \times 80$

.....  
.....  
.....  
.....

e)  $t = 24,5 \times 500$

.....  
.....  
.....  
.....

f)  $h = 2,634 \times 900$

.....  
.....  
.....  
.....

20.5.2 Check your answers with a calculator.

20.6 MULTIPLYING DECIMAL FRACTIONS WITH DECIMAL FRACTIONS

20.6.1 Read the following problem and work through the different solutions with a friend:

A tortoise walks 0,8 km in 1 hour. How far will he walk in 0,6 of an hour?

a)

I convert the decimal fractions to proper fractions:

**Equation:**

$$\frac{\quad}{\quad} \times \frac{\quad}{\quad} = \frac{\quad}{\quad}$$

Thus he walks 0,48 km.

b) I first work out what  $8 \times 6$  is. The answer is 48. Now I add up the amount of decimal places after each comma. There are 2. Thus, my answer must have 2 digits after the decimal comma.

The answer is thus 0,48.

20.6.2 What do you notice when you compare the answer (product) with the multiplicand?

.....

.....

Can you explain this?

.....

.....

20.7 REMEMBER!

$$4,6 \times 0,4 = 1,84$$

$1 + 1 = 2$

digits after the decimal comma

$$0,467 \times 0,23 = 0,10741$$

$3 + 2 = 5$

digits after the decimal comma

20.8 Calculate the following on your own without a calculator:

a)  $j = 0,146 \times 3,4$

b)  $v = 2,41 \times 0,57$

c)  $u = 0,025 \times 4,36$

d)  $g = 8,143 \times 0,68$

e)  $d = 7,293 \times 5,29$

f)  $o = 3,849 \times 4,36$

21. Time for self-assessment

• Put an in the applicable block:	Uncertain	Certain
I can add decimal fractions correctly.		
I can subtract decimal fractions correctly from each other.		
I can multiply decimal fractions by 10 correctly.		
I know how to multiply decimal fractions by 100.		
I can calculate the product of decimal fractions and 1 000 correctly.		
I can multiply decimal fractions by whole numbers.		
I can multiply decimal fractions by decimal fractions.		

22. Let us play a game.

You need a friend and a calculator for this game.

Key in any decimal number on your calculator.

Then divide it by 10, 100 or 1 000. Give the calculator to your friend. He/She must get the original number again.

e.g. Player 1 keys in : 43,674.

Player 1 divides 43,674 by 1 000 and gets 0,043674.

Player 2 must get 43,674 on the screen.



Player 2 must thus  $\times$  by 1 000!

## 23. DIVISION BY DECIMAL FRACTIONS

Let us first revise.

23.1 Divide into groups of 3. Can you explain to each other what happens when we divide natural and decimal numbers by 10, 100 and 1 000?

.....

.....

.....

.....

23.2 Take turns in saying the answers of the following to each other, out aloud.

- a)  $6 \div 10$
- b)  $0,3 \div 10$
- c)  $0,06 \div 100$
- d)  $2,9 \div 100$
- e)  $4 \div 100$
- f)  $15,8 \div 100$
- g)  $8 \div 1\,000$
- h)  $39,2 \div 100$
- i)  $34,67 \div 1\,000$
- j)  $27,458 \div 10$

23.3 Colour the answers to find the correct “path” to the house!

- a)  $82,1 \div 10$
- b)  $86,4 \div 100$
- c)  $746,8 \div 10$
- d)  $625,4 \div 1\,000$
- e)  $39,2 \div 1\,000$

f)  $72,9 \div 100$

g)  $879,1 \div 100$

h)  $6 \div 10$

i)  $35 \div 1\,000$

j)  $8 \div 100$

BEGIN								
8,21	0,821	6,254	39,2	0,729	879,1	0,6	35	0,8
0,864	7,468	0,6254	0,0392	7,29	8,791	6	0,035	0,08
8,64	74,68	62,54	3,92	729	87,9	60	3,5	80

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.3:** We know this when the learner recognises, classifies and presents the following numbers in order to describe and compare them:

1.3.4 numbers in exponential form including squares of natural numbers to at least  $12^2$ , cubes of natural numbers to at least  $5^3$ , and their square and cube roots;

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

1.7.7 rounding off numbers to at least one decimal place;

**Assessment Standard 1.9:** We know this when the learner uses a range of techniques to perform calculations including:

1.9.2 using a calculator;

**Assessment Standard 1.10:** We know this when the learner uses a range of strategies to check solutions and judges the reasonableness of solutions.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in a variety of ways using:

2.3.3 tables.

Division by multiples of 10

## MATHEMATICS

### Decimal Fractions

## EDUCATOR SECTION

### Memorandum

23.4.2 a) 0,041

- a. 0,81
- b. 0,0093

- b en c

23.6 a) 1,234

- a. 0,845
- b. 7,23

25. a) R51

- a. R211,59
- b. 21160c
- c. R2,90
- d. Ja

Cost per call: R1,77

- a. 91,5
- b. R102,13
- c.  $R1,28 \times 24 = R30,72$
- d. R3,27
- e. Own answers

## Leaner Section

### Content

#### ACTIVITY: Division by multiples of 10 [LO 1.5.1, LO 1.7.5]

##### 23.4 DIVISION BY MULTIPLES OF 10

###### 23.4.1 Do you still remember?

a) This is how I divide 0,8 by 40:

$$0,8 \div 40 = (0,8 \div 10) \div 4$$

$$= 0,08 \div 4$$

$$= 0,02$$

b) When I divide 4,2 by 600, I say:

$$4,2 \div 600 = (4,2 \div 100) \div 6$$

$$= 0,042 \div 6$$

$$= 0,007$$

###### 23.4.2 Calculate the following without a calculator:

a)  $j = 3,28 \div 80$

.....  
.....

.....  
.....

b)  $d = 567 \div 700$

.....  
.....

.....  
.....

c)  $g = 18,6 \div 2\,000$

.....  
.....

.....  
.....

## 23.5 DIVISION WITH DECIMAL FRACTIONS

23.5.1 Work through the following examples with a friend:

A roll of material is 11,25 m long. 1,5 m of material is needed to make one dress.

How many dresses can be cut from this roll of material?

a) I must calculate  $11,25 \div 1,5$

I change the decimal fractions to fractions:

— en — —

**Equation:**

— — — —  
— —  
—

I make use of **equivalent fractions**:

**Equation:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

c) I must calculate  $11,25 \div 1,5$  I change the **divisor to a whole number** so that I can divide easier.

$1,5 \times 10 = 15$

To keep the balance in the sum, I must also multiply the dividend by 10!

$11,25 \times 10 = 112,5$

		7		,5
	15	112		,5
		-105		
		7		5
			-7	5
			.	.

The answer is thus 7,5 dresses..

23.5.2 Which of the above-mentioned methods are precisely the same?

.....

.....

.....  
.....

23.5.2 Which of the above-mentioned methods are precisely the same?

23.6 Calculate the following by first changing the divisor to a whole number:

a)  $q = 0,88848 \div 0,72$

.....  
.....

.....  
.....

.....  
.....

.....  
.....

b)  $p = 0,14365 \div 0,17$

.....  
.....

.....  
.....

.....  
.....

.....  
.....

c)  $v = 0,30366 \div 0,042$



.....  
.....

.....  
.....

.....  
.....

.....  
.....

24. Time for self-assessment

<ul style="list-style-type: none"><li>• Tick the applicable block:</li></ul>	YES	NO	
I can divide decimal fractions by 10 correctly.			
I can divide decimal fractions by 100 correctly.			
I can divide decimal fractions by 1 000 correctly.			
I know how to divide decimal fractions by multiples of 10.			
I can divide decimal fractions by decimal fractions.			

25. Look at the following telephone account and answer the questions. You may use your calculator.

Your detailed invoice				
Rental				
Service/no	Description	Period	No	Cost
0219135676	Indoor Extension	21 Apr 02 – 20 May 02	4	R9,60
0219135676	Your line(s)	21 Apr 02 – 20 May 02		R59,40
Total (Rental)				R69,00
Usage – see call details record for more information				
Call type			No. of calls	Costs
Access: Basic Telephony Services				
Calls from service no. 0219135676				
International United Kingdom			1	R51,29
National 0-50km			97	R91,46
National >50km			11	R10,67
Cellular (MTN)			9	R15,90
Cellular (Vodacom)			14	R40,56
Sharecall			2	R1,28
Special Services			1	R0,43
Total (Usage)			1	R211,59
Payments received				
Receipt no	Description	Date	Amount	
150608	Payment received	12 Apr 02	R196,73 CR	
Total (Payments received)			R196,73 CR	

a) Round off the cost of the overseas call to the nearest rand.

.....

b) What is the total cost of the calls that were made?

.....

c) Round off the above answer to the nearest cent.

.....

d) What was the average cost of each cell phone (Vodacom) call?

.....

e) Is MTN cheaper than Vodacom? ..... Motivate.

.....

.....  
.....

.....  
.....

f) Round off the cost of the national calls (0 – 50 km) to 1 digit after the comma.

.....  
.....

g) What is the total cost of the national calls?  
.....

h) If two “ShareCall” calls cost R1,28, what would 48 such calls cost?  
  
.....  
.....

i) The account is paid with a R200 note and a R20 note. How much change will be given?  
  
.....  
.....

j) How much is YOUR telephone account each month, on average, over a period of one year?  
  
.....  
.....

**Assessment**

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.5:** We know this when the learner solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues such as:

1.5.1 financial (including profit and loss, budgets, accounts, loans, simple interest, hire purchase, exchange rates);

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

1.7.5 division of positive decimals with at least 3 decimal places by whole numbers.

“Noughts and Crosses” and Module Test

## MATHEMATICS

### Decimal Fractions

### EDUCATOR SECTION

### Memorandum

#### MODULE TETS 5

1. a) 0,68

a. 0,875

b. 0,45 (3)

2. a) 8432,17

8432,168

8432,2 (3)

3.

	23,6489
	23 648,9
	0,236489

	236 489
--	---------

(4)

4. a) 523,017 (2)

a. 0,987 (3)

b. 1,34 (2)

5. 180 2,25

80 times (4)

6. 88,5 x 28,3

2 504,55 m (4)

## **Leaner Section**

### **Content**

#### **ACTIVITY: “Noughts and Crosses” and Module Test**

26. Let us play “Noughts and Crosses”!

You need a friend and a rectangle with decimal numbers as in the example.

You may also write your own decimal numbers in the blocks.

- Player 1 chooses any number on the rectangle and must say what number  $\div$  or  $\times$  by 10, 100 or 1 000 will give that number.

e.g.  $2,5 : 25 \div 10 = 2,5$  or

$0,025 \times 100 = 2,5$

0,9	2,2	0,45	1,4
2,5	0,08	0,91	0,17
0,007	3,6	0,168	0,024
0,14	0,98	0,016	4,1

- Player 2 checks with the calculator.
- If player 1 is correct, he marks his block with a x or o.
- Take turns until one of the players is the first one to get 4 x's or o's in a row. (horizontal, vertical or diagonal).

#### MODULE TEST

1. Write as a decimal fraction:

a)  $\frac{17}{25}$  .....

b)  $\frac{7}{8}$  .....

c)  $\frac{9}{20}$  ..... (3)

**2. Round off 8432,1679:**

a) to 2 digits after the decimal comma: .....

b) to the nearest 1 000th: .....

c) to the nearest tenth: ..... (3)

3. Complete the table:

Number	236,489
$\div 10$	.....
$\times 100$	.....
$\div 1\,000$	.....
$\times 1\,000$	.....

(4)

4. Calculate without a calculator:

a)  $r = 2\,000 - 1476,983$

.....

.....

.....

..... (2)

b)  $t = R4,70 \times 0,21$

.....

.....

.....

.....

.....

..... (3)



c)  $u = 26,80 \div 20$

.....

.....

.....

..... (2)

5. How many times can a bottle with a capacity of 2,25 ℓ be filled from a 180 ℓ container?

.....

.....

.....

.....

.....

.....

.....

..... (4)

6. A space shuttle travels 88,5 m per second. How far will it travel in 28,3 seconds?

.....

.....

.....

.....

.....

.....

.....

.....

..... (4)

(25)

How to calculate a percentage of an amount

## **MATHEMATICS**

### **Percentages**

## **EDUCATOR SECTION**

### **Memorandum**

- (i) 23 909 920

i. 42 840 000

ii. 320

15.3.1

a) R31,04

b) 15 mm

15.3.2

a) R525

b) R3,00

c) 8,25 kg

d) R12,69

16.3

a) 25%

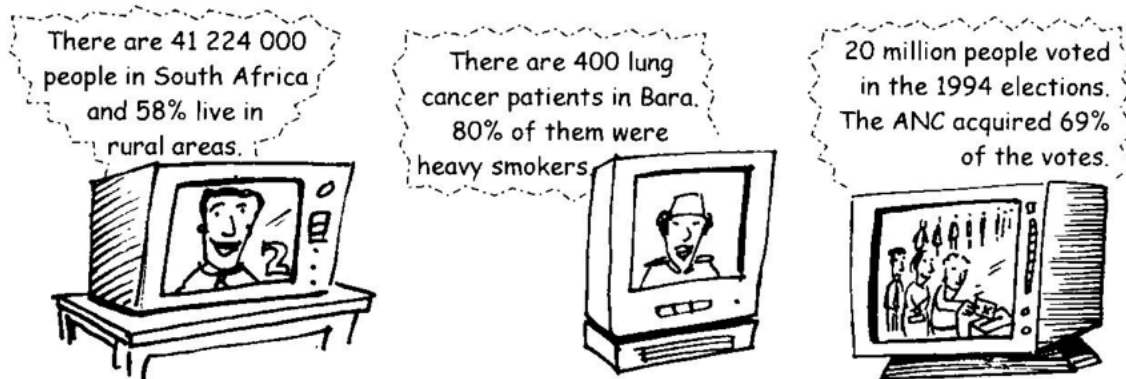
b) 8,3%

- c) 70%
- d) 37,5%
- e) 80%
- f) 66, 6%

## Leaner Section

### Content

**ACTICITY: How to calculate a percentage of an amount [LO 1.7.6, LO 1.9.2, LO 2.7.1 ]**



a) Work together with a friend. Can you calculate the answers with the help of a calculator?

- (i) How many people live in rural areas?
- (ii) How many votes did the ANC get?
- (iii) How many patients were heavy smokers?

b) How did you calculate the answers?

### 15.2.1 REMEMBER!

To calculate the percentage of an amount:

a) **Write the percentage as a fraction with the denominator 100**

**OR Write the percentage as a decimal fraction**

b) **Multiply this fraction / decimal fraction with the amount / number / quantity that is given**

In the example above:

**Equation:**

$$58 = \frac{58}{100}$$

$$\begin{array}{r} \frac{58}{100} \times \frac{41224000}{1} \\ \hline \frac{5841224000}{100} \end{array} \quad \text{OR}$$

= 23909920people

### 15.2.2 Remember also!

With a calculator: multiply 41 224 000 by 58 %

You will thus key in: **58 ÷ 100 × 41 224 000 =**

OR

$$\mathbf{58\% \times 41\,224\,000 =}$$

### 15.3.1 Calculate the following without a calculator:

a. 25% of R124, 16

.....

.....

.....

.....

b) 50% of 30 mm

.....

.....

.....

.....

15.3.2 Use your calculator and calculate:

a. 15% of R3 500

.....

.....

.....

.....

b) 12% of 25

.....

.....

.....

.....

c) 37,5% of 22 kg

.....

.....

.....

.....

d) 75% of R16,92

.....

.....

.....

.....

16. One amount as a percentage (%) of another amount

16.1 Work together with a friend. Look carefully at the following problem and the solution.

Top Teenage T-shirts printed 120 T-shirts. 72 were sold immediately. What % of the T-shirts were sold?

72 % of the 120 T-shirts were sold : thus  $\frac{72}{120}$  % means something out of 100

Thus:  $\frac{72}{120} \times \frac{100}{1} = 60\%$

16.2 REMEMBER!

To calculate % of amounts:

a) **Convert first to the same unit**

b) **Express the given amounts as a fraction:**

amount	(in the same unit!)
other amount	

c) **Multiply it by 100**

16.3 Calculate how much % the first amount is of the second amount (you may use your calculator):

a) 120 of 480

.....

.....

.....

b) 23 of 276

.....

.....

.....

c) 3 500 ml of 5 litre

.....

.....

.....

d) 750 g of 2 kg

.....

.....



.....

e) 4 out of 5 for a test

.....

.....

.....

f) 2 out of balle

.....

.....

.....

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems that involve:

1.7.6 finding percentages;

**Assessment Standard 1.9:** We know this when the learner uses a range of techniques to perform calculations including:

1.9.2 using a calculator.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.7:** We know this when the learner determines, analyses and interprets the equivalence of different descriptions of the same relationship or rule presented:

2.7.1 verbally.

Percentages – discount and increases

## **MATHEMATICS**

### **Percentages**

## **EDUCATOR SECTION**

### **Memorandum**

17.4

a) R179,97

b) R254,58 (rounded off)

c) R10 665

d) R16 794,75

17.5.2

a) 10,7%

b) 10%

## **LEARNER SECTION**

### **Content**

**ACTIVITY: Percentages – discount and increases [LO 1.7, LO 2.7.1]**

## **17. PERCENTAGES – DISCOUNT AND INCREASES**

17.1 Look at the following advertisements



17.2 Did you know?

**COST PRICE** : The amount that the dealer / trader / merchant pays for an article

**MARKED PRICE** : This is the price of the article

**SELLING PRICE** : This is the price after discount

**PROFIT** : Sale price – cost price

17.3 Work together with a friend through the following problem and solutions:

(i) The price of a tub of margarine is R6,99. If the price is going to rise by 10 %, how much will you have to pay for the margarine in the future?

a) New price is  $R6,99 + 10\% \text{ of } R6,99 = R6,99 + 70 \text{ c (rounded off)} = R7,69$

b) New price is  $(100 + 10)\% \text{ of } R6,99$

$= 110\% \text{ of } R6,99$

**Equation:**

$$= \frac{110}{100} \times \frac{699}{1}$$

$= R7,69 \text{ (rounded off)}$

Which method do you choose? .....

Why?

.....

(ii) Top Teenage T-shirts have a 20 % discount on all T-shirts. If the T-shirt originally cost R189,90, what will you pay for it now?

a)

I only pay 80% (100% - 20% discount)

$$\text{Thus: } \frac{80}{100} \times \frac{189,90}{1}$$

$$= \text{R } 151,92$$

b)

$$20\% \text{ of R}189,90 = \frac{20}{100} \times \frac{189,90}{1}$$

The discount is thus R37,98

$$\text{I pay R}189,90 - \text{R}37,98 = \text{R}151,92$$

Which method do you choose? .....

Why?

17.4 What will you pay for the following items?

a)



.....

.....

.....

.....

b)



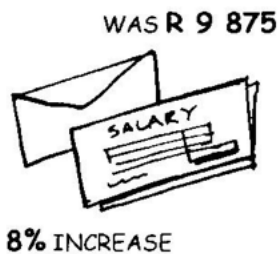
.....

.....

.....

.....

c)



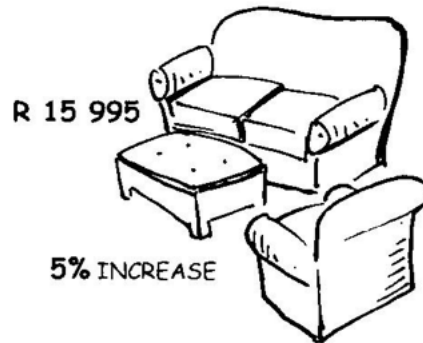
.....

.....

.....

.....

d)



.....

.....

.....

.....

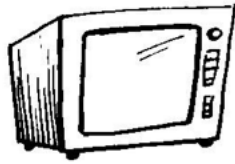
### 17.5.1 Important to remember!

$$\begin{aligned} \text{a) } \% \text{ discount} &= \frac{\text{market price} - \text{selling price}}{\text{market price}} \times \frac{100}{1} \\ &= \frac{\text{discount}}{\text{market price}} \times \frac{100}{1} \end{aligned}$$

17.5.2 Divide into groups of three. Can you calculate how much % discount was given on the following items?

a)

WAS R 1 523



NOW R 1 360

.....

.....

.....

.....

b)

WAS  
R 586



NOW R 527,40

.....

.....

.....

.....

17.5.3 Explain your method(s) to the rest of the class.

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.7:** We know this when the learner estimates and calculates by selecting and using operations appropriate to solving problems;

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.7:** We know this when the learner determines, analyses and interprets the equivalence of different descriptions of the same relationship or rule presented:

2.7.1 verbally.

Profit and lost

## MATHEMATICS

### Percentages

## EDUCATOR SECTION

### Memorandum

18.2

	Cost price	Selling price	Loss / Profit	% Loss / Profit
a)			R623	24,92% profit
b)			R80	28,57% loss
c)			R9,99	27,75% profit
d)		R19,14	R2,64	
e)		R765	R135	

- a) 14%

- a. Jobcreating, housing, etc.
- b. Milk, fresh fruit and veg. and meat



19.3 a) 41c

b) R2,66

c) R69,86

a. R770

20. Pay VAT firstly, and then get discount.

21.

a) >

b) <

c) =

d) <

e) =

f) =

g) >

h) >

i) 0,55

j) 0,125

k) 1,42

l) 0,03

m) 0,45

n) 0,075

o) 0,625

LEANER SECTION

Content

ACTIVITY: Profit and lost [LO 1.4, LO 2.3.3]

18. PROFIT AND LOST

18.1 Important to know!

Profit = selling price – cost price

			×	<table><tr><td>100</td></tr><tr><td>1</td></tr></table>	100	1			
100									
1									
<table><tr><td>% profit</td><td>=</td><td>selling price – cost price</td></tr><tr><td></td><td></td><td>cost price</td></tr></table>	% profit	=	selling price – cost price			cost price			
% profit	=	selling price – cost price							
		cost price							
			×						

	=	profit		100
		cost price		1

Loss = when you pay more for an item than what you sell it for

			×	
% loss	=	loss		100
		cost price		1

18.2 Complete the table with help of your calculator.

	Cost price	Selling price	Loss / Profit	% Loss / Profit
Bv.	R125	R160	R35	28% profit
a)	R2 500	R3 123	.....	.....

b)	R280	R200	.....	.....
c)	R36	R45,99	.....	.....
d)	R16,50	.....	.....	16% profit
e)	R900	.....	.....	15% loss

### 19.1 Did you know?

**Value added tax (VAT)** is an amount of money that is determined by the Minister of Finance. This forms part of the government's budget. It is also called sales tax.

### 19.2 Find out

a) What % VAT are we currently paying?

.....  
 .....  
 .....

b) What does the government do with the money that comes in through VAT?

.....  
 .....  
 .....  
 .....

c) Which items are not taxed by VAT?

.....  
 .....  
 .....

.....  
.....

19.3 Calculate the VAT at 14 % on the following amounts. You may use your calculator.

a) R2,95 :  
.....

b) R18,99 :  
.....

c) R499 :  
.....

d) R 5 500 :  
.....

20. BRAIN-TEASER!

You buy an article for cash and get a 10 % discount. You also have to pay 14 % VAT. What is the most advantageous for you: to first pay the tax and then get the discount or vice versa?

.....  
.....

.....  
.....

.....  
.....

.....  
.....

21. Can you complete the following mental test within 3 minutes?

Fill in: < ; > ; = :	Write as a decimal fraction:
a) 0,8 ..... 8%	i) 55% : .....
b) $\frac{3}{4}$ ..... 76%	j) $\frac{1}{8}$ : .....
c) 60% ..... 0,6	k) 142% : .....
d) $\frac{4}{5}$ ..... 85%	l) 3% : .....
e) 0,835 ..... 83,5%	m) $\frac{9}{20}$ : .....
f) 0,02 ..... 2%	n) $7\frac{1}{2}\%$ : .....
g) $\frac{1}{3}$ ..... 33%	o) $62\frac{1}{2}\%$ : .....
h) 12,5% ..... $\frac{1}{8}$	

(15)

Colour in: : I did   

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.4:** We know this when the learner recognises and uses equivalent forms of the rational numbers listed above;

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.3:** We know this when the learner represents, explains and justifies observed relationships or rules in own words:

2.3.3 tables.

Pie Graph with Percentage

## MATHEMATICS

### Percentages

## EDUCATOR SECTION

### Memorandum

- a) (i)  $\frac{1}{8} / \frac{12,5}{100} / \frac{125}{1000}$

(ii)  $\frac{3}{20}$

a. 15

(  $\frac{1}{4}$  of 60)

a. 9

(15–6)

22.2 a)  $\frac{1}{10}$  of 24 = 2,4

2 hour 24 minutes

b) Fieldwork

Fitness

c)  $\frac{1}{8}$

a. 3,6 hour

3 hour 36 minutes



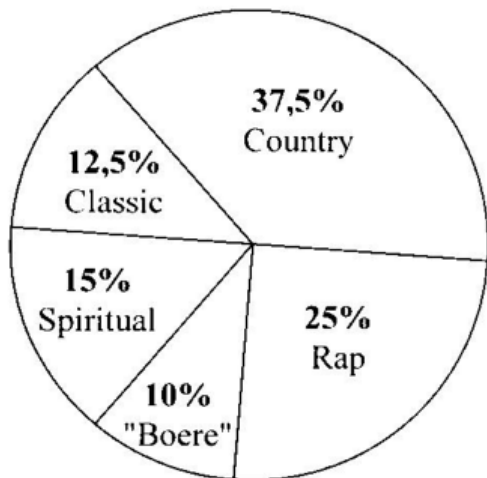
## Leaner Section

### Content

#### ACTIVITY: Pie graph with percentage (%) [LO 2.6, LO 5.8, LO 5.9]

##### 22. PIE GRAPH WITH PERCENTAGE (%)

22.1 Study the following pie graph with a friend and then answer the questions that follow:



The music taste of a Grade 7 class:

a) What fraction of the learners likes

(i) classical music? .....

(ii) spiritual music? .....

b) If there are 60 learners in the class, how many listen to “rap”?

c) What is the difference between the number of learners who listen to “Boere” music and to “rap”?

d) What kind of music is your favourite?

22.2 Now look at this pie graph that shows the South African cricket team's daily routine. Answer the following questions:



a) How many hours each day is allowed for relaxing?

b) What do they spend the equal amount of time on?

c) What fraction of the day is spent on bowling practise?

d) How many hours per day are allocated to fitness exercises?

23. CHALLENGE!

Can you draw a column graph from one of the pie graphs?

24. Time for self-assessment

<ul style="list-style-type: none"> <li>• Tick the applicable block:</li> </ul>	YES	NO	
I can calculate % of amounts (15.1 – 15.3).			
I can write one amount as a % of another amount (16.1 – 16.3).			
I can calculate % discount.			
I can calculate % increase.			

I can calculate profit.			
I can calculate loss.			
I can calculate VAT on items.			
I can interpret pie graphs and answer questions based on them.			
I can draw a column graph.			

## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.6:** We know this when the learner describes a situation by interpreting a graph of the situation, or draws a graph from a description of a situation (e.g. height of a roller-coaster car over time; the speed of a racing car going around a track);

**Learning Outcome 5:** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

**Assessment Standard 5.8:** We know this when the learner draws a variety of graphs by hand/technology to display and interpret data (group and ungrouped) including:

5.8.3 pie charts;

**Assessment Standard 5.9:** We know this when the learner critically reads and interprets data presented in a variety of ways to draw conclusions and make predictions.

## Research Task and Module Test

# MATHEMATICS

## Percentages

### EDUCATOR SECTION

#### Memorandum

#### MODULE TEST 6

1. a) 5% b) 12%

a. 73,3%

2. a)  $\frac{2}{25}$  b)  $\frac{9}{20}$

3. 0,5;  $\frac{1}{4}$ ;  $\frac{1}{5}$ ; 15%

4. a) R70

a. R58,50

5. 42%

6. R297,50

7. R36,29 (ronded off)

8. 20%

9. DISCOUNT X 100

MARK PRICE 1

## Leaner Section

### Content

#### ACTIVITY: Research Task and Module Test [LO 1.5, LO 2.6, LO 5.9]

25. A bigger challenge!

Do the following as a separate research task. Use your own paper, or folio supplied by your educator. Remember to work neatly!

- a) You are going to start a business – open a shop. Decide on your own what kind of shop it will be.
- b) Do market research and supply a list of items that you will buy for your shop. (choose only five) Give each item a realistic cost price.
- c) Now add 14 % VAT to each item and list it in a table, e.g.:

Item	Cost Price	With VAT

d) Decide what you will sell each item for. Give a clear explanation of your cost price and selling price by means of a line graph. (*Hint : use different colours*)

e) Calculate how much % profit you will make on each item, e.g.

Item	% Profit

f) Design an advertisement that will announce the opening of your new shop.

g) Now work out a monthly budget for your shop – how much money you need to let everything go smoothly. (*Hint : think about water and lights, telephone, employees, etc.*)

### MODULE 6 TEST

1. Write the following as percentage (%):

a) 0,05 : ..... b)  $\frac{3}{25}$  : ..... (2)

c)  $\frac{11}{15}$  : ..... (2)

2. Convert to a common fraction and simplify:

a) 8% : ..... b) 45% : .....

..... (4)

3. Rearrange from big to small:

$\frac{1}{5}$  ; 15% ; 0,5 ;  $\frac{1}{4}$

(2)

4. Calculate:

a) 20% of R350

(2)

b)  $12\frac{1}{2}\%$  of R468



(2)

5. What % is 840 g of 2 kg?

(4)

6. I get 15 % discount on a pair of shoes that are marked at R350. How much must I pay for the shoes?

(4)

7. The price of cheese is R32,99 / kg at present. It will increase by 10 % shortly. What is the new price / kg going to be?

(4)

8. A furniture dealer buys a lounge suite for R12 000 and sells it for R15 000. What % profit does he make?

(2)

9. Write down the formula for % discount.

(2)

## **Assessment**

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.5:** We know this when the learner solves problems in context including contexts that may be used to build awareness of other Learning Areas, as well as human rights, social, economic and environmental issues;

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using

algebraic language and skills.

**Assessment Standard 2.6:** We know this when the learner describes a situation by interpreting a graph of the situation, or draws a graph from a description of a situation (e.g. height of a roller-coaster car over time; the speed of a racing car going around a track);

**Learning Outcome 5:** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

**Assessment Standard 5.9:** We know this when the learner critically reads and interprets data presented in a variety of ways to draw conclusions and make predictions.

Geometry

## **MATHEMATICS**

### **Space and Shape**

#### **EDUCATOR SECTION**

##### **Memorandum**

1. General discussion about geometry.

2. (1) EARTH (geo)

(2) MEASUREMENT (metry)

4. (a) a point

(b) angle

(c) figures

6. (a) construction line

(b) drawing line

(c) a broken line

7.1 (a) horizontal

vertical

diagonal

(b) parallel

//

(c) perpendicular

right

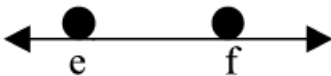
⊥

8 (a) 6

AB; AD; BC; CD; AC; BD

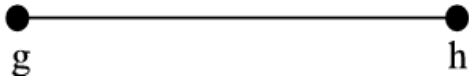
BD: 40 mm

(b) HJ; JH; IJ; IH

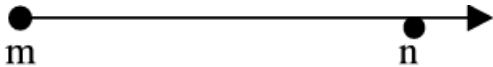


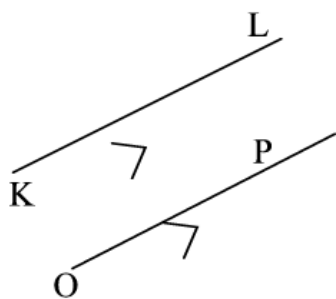
(c)

(d)



(e)

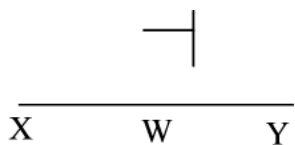




(f)



(g)



## Leaner Section

### Content

#### ACTIVITY: Geometry [LO 1.8, LO 3.4]

1. Let us begin with a class discussion. What, do you think, is GEOMETRY all about?
2. Did you know?

Geometry is derived from two Greek words? Decipher the code and find out what the two words are.

1.

a)  $72 \div 8$

b)  $7 \times 6$

c)  $9 \times 4$

d)  $9 \times 6$

e)  $144 \div 12$

---

(geo)

2.

a)  $12 \times 8$

b)  $36 \div 4$

c)  $29 + 13$

d)  $56 - 18$

e)  $11 \times 4$

f)  $12 \times 3$

---

(metry)

A	D	E	G	J
42	8	9	11	56
I	K	M	N	O
7	26	96	24	5
R	S	T	U	H
36	38	54	44	12

### 3. Did you know?

More than 5 000 years ago, the Ancient Egyptians in the Nile Valley applies geometrical rules to build their pyramids. The Babylonians also used geometry to build their temples and to develop their irrigation systems. The famous Greek mathematician, Euclid, lived 300 B.C. According to him, the foundations of geometry are points, lines and planes.

### 4. BRAIN TEASER!

a) What is the shortest possible line?

---

b) What do we get when we join two lines together so that they bisect each other?

---

—

c) What do we get when we add more lines to b?

---

### 5. IMPORTANT FACTS to KNOW

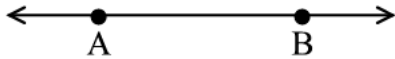
POINT: A point only has a position and no size.

We indicate it with a small dot ( • ).

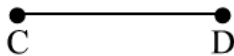
LINE: When we have two points, we can draw a line through them.

A line only has length and neither breadth nor height

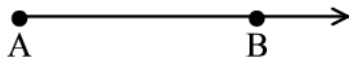
A straight line has no beginning or end.



LINE SEGMENT: A line segment is part of a line. It has a starting point and an end point.



RAY: A ray has a beginning point. It continues indefinitely in the same direction and doesn't have an end point. (Think of the rays of the sun.)



PLANE: A plane has length and breadth (two-dimensional), but not height. You can perceive it as a “flat” space, e.g. a rectangle.



## 6. BRAIN-TEASER!

a) What do we call this line? . . . . .

It is used when we are constructing a figure.



\_\_\_\_\_

\_\_\_\_\_

b) What do we call this line? \_\_\_\_\_

It is usually dark and is used for the final lines of a drawing.

\_\_\_\_\_

\_\_\_\_\_

c) This line is used for hidden or invisible lines. \_ \_ \_ \_ \_

(it is not a dotted line)

\_\_\_\_\_

\_\_\_\_\_

7.1 Do you still remember?

§ Can you fill in the missing answers?

a) Kinds of lines: Lines can be:

\_\_\_\_\_ : \_ \_ \_ \_ \_

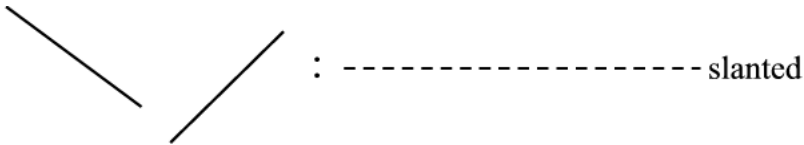
i)

ii)

| : \_ \_ \_ \_ \_

:

iii)



b) Lines that are equidistant from each other and never meet are called \_\_\_\_\_ lines.

We use the symbol \_\_\_\_\_ to show the lines “are parallel to each other.”

c) Two lines are \_\_\_\_\_ to each other when they bisect each other, forming a  $90^\circ$  angle.

We call this angle a \_\_\_\_\_ angle.

We use the symbol \_\_\_\_\_ to indicate “is perpendicular to”.

7.2 Design a wall hanging by making use of horizontal and vertical lines only. Colour it in neatly.

7.3 Can you explain to a friend how one draws a perpendicular line?

7.4 Can you explain how we draw parallel lines?

---

---

---

---

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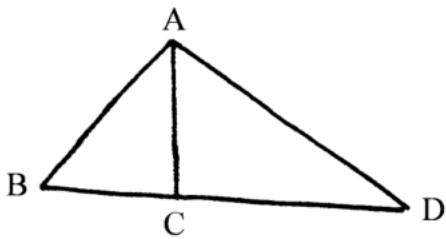
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---

8. LET US TEST YOUR KNOWLEDGE!



a)

How many line segments are in the sketch?

---

Please name them:

---

---

---

Measure the length of each line segment:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



b)

Name the four rays in the sketch.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

c) Draw line EF.



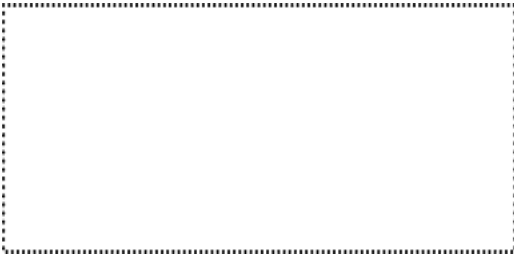
d) Draw line segment GH 32 mm long.



e) Draw ray MN.



f) Draw KL // OP.



g) Draw VW XY.



## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate

and check with competence and confidence in solving problems.

**Assessment Standard 1.8:** We know this when the learner performs mental calculations involving squares of natural numbers to at least  $10^2$  and cubes of natural numbers to at least  $5^3$ .

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.4:** We know this when the learner designs and uses nets to make models of geometric solids studied up to and including this grade.

Angels

## **MATHEMATICS**

### **Space and Shape**

#### **EDUCATOR SECTION**

##### **Memorandum**

- (a) acute

(b) right

(c) obtuse

(d) straight

(e) reflex

(f) revolution

9.2

(a)  $37^\circ$

(b)  $128^\circ$

(c)  $60^\circ$

(d)  $90^\circ$

(e)  $120^\circ$

(f)  $87^\circ$

- (a) equal in size

(b) The length of the lines has nothing to do with the size of the angles

.

- NE :  $048^\circ$

E :  $090^\circ$

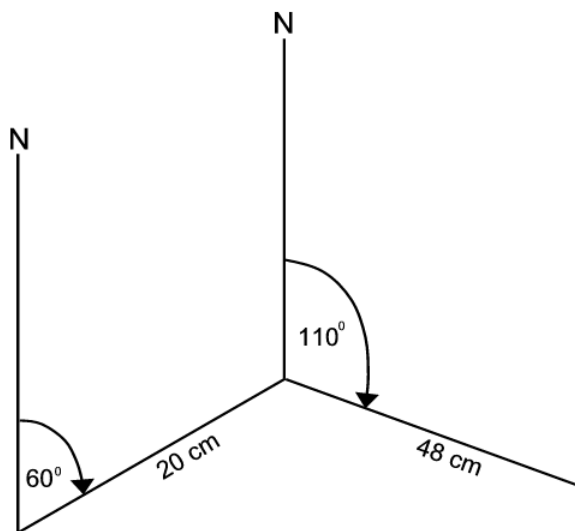
SE:  $133^\circ$

S:  $180^\circ$

12.3 C :  $125^\circ$  F :  $070^\circ$

E :  $250^\circ$  K :  $295^\circ$

W :  $190^\circ$



12.4

**Leaner Section**

**Content**









**ACTIVITY: Angels [LO 4.8, LO 4.9, LO 3.8]**

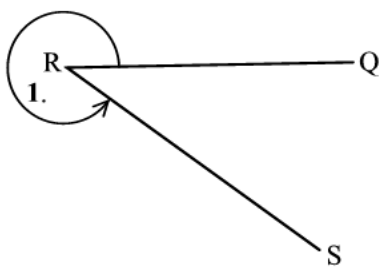
**9. LET US REVISE**

When lines are joined, angles are formed.

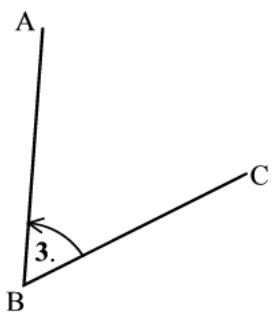
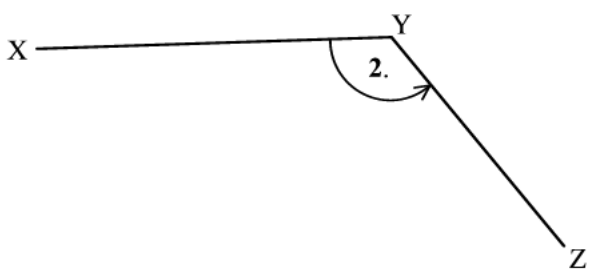
9.1 Work in groups of three. See which group can state the kind of angle in each diagram!

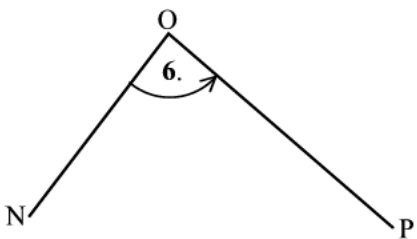
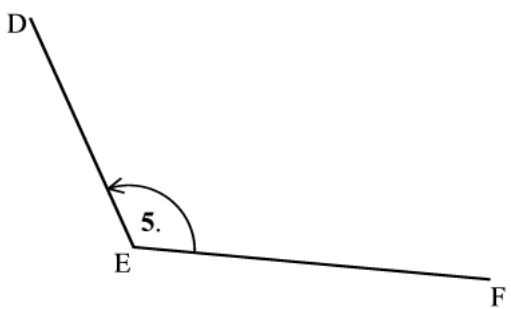
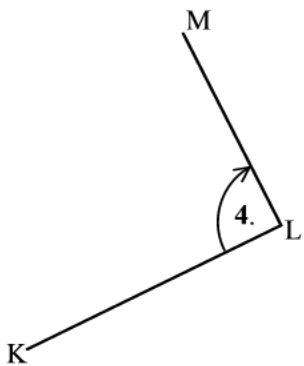
SKETCH	KIND OF ANGLE	DEGREES
a) 	.....	$<90^\circ$
b) 	.....	$90^\circ$
c) 	.....	$90^\circ < \text{angle} < 180^\circ$
d) 	.....	$180^\circ$
e) 	.....	$180^\circ < \text{angle} < 360^\circ$
f) 	.....	$360^\circ$

.2 Estimate the sizes of the following angles. Then measure them carefully with your protractor and complete the table.



o





	Angle	Estimated	Measured
a)	1	_____	_____

b)	2	_____	_____
c)	3	_____	_____
d)	4	_____	_____
e)	5	_____	_____
f)	6	_____	_____

9.3 Draw the following angles with the help of your protractor:

a)  $49^\circ$

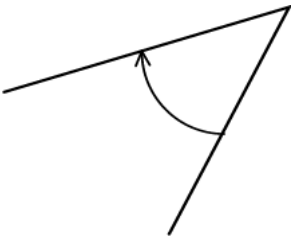
b)  $97^\circ$

c)  $196^\circ$

d)  $216^\circ$

9.4 BRAIN-TEASER!

a) Which angle is the larger: a or b?



b)

---

---

b) What have you realised?

---

---

---

---

---

---

## 9.5 REMEMBER!

The size of an angle is determined by the amount of rotation there is around the fulcrum.

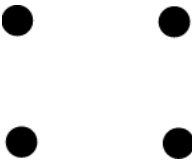
$\lambda$ POINT
A number of points together form a
LINE
Lines segments joined give

ANGLES
Angles joined together form
FIGURES

## 11. BRAIN-TEASER!

What is the smallest number of straight lines that can be used to join the dots below WITHOUT lifting up your pencil?

(Can you do it with three lines?)



## 12. ANGLES AND NAVIGATION

### 12.1 Did you know?

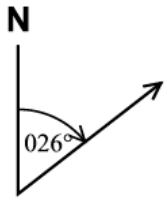
In navigation and aviation, direction is always determined in terms of the angle which is made by the route (clockwise) with the north line.

i.e. we measure in degrees, the amount of turning from north.

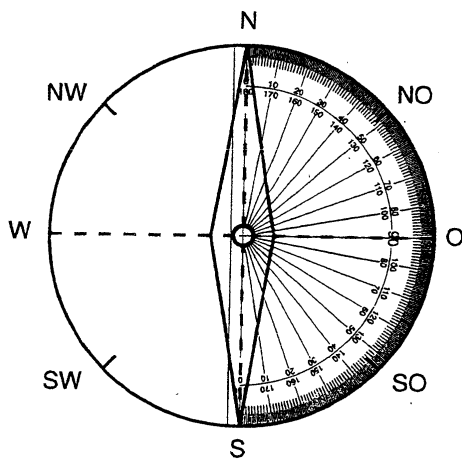
Line to the route in a clockwise direction.

The north line is  $0^\circ$ .

A bearing is always indicated with three digits. A bearing of  $26^\circ$  is written as  $026^\circ$ .



12.2 Look carefully at this magnetic compass. A compass needle always points to north. Now write down the following directions in degrees.

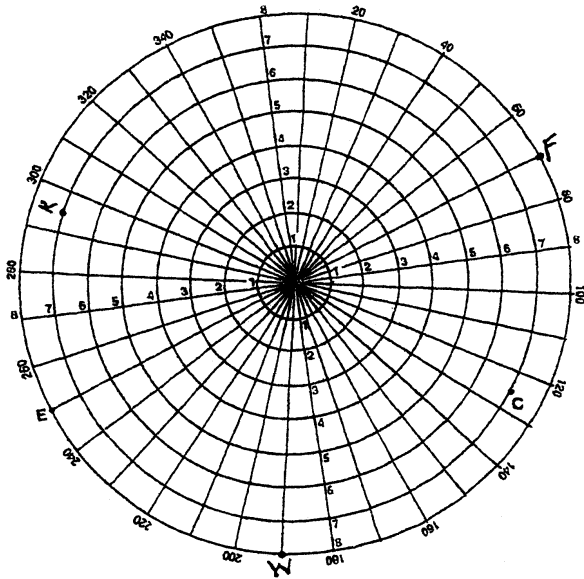


NE : \_\_\_\_\_

E : \_\_\_\_\_

SE : \_\_\_\_\_

S : \_\_\_\_\_



12.3 Study this radar screen which can be found on a boat. Write the direction of the following boats in degrees:

C : \_\_\_\_\_

E : \_\_\_\_\_

F : \_\_\_\_\_

K : \_\_\_\_\_

W : \_\_\_\_\_

## Assessment

**Learning Outcome 4:** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

**Assessment Standard 4.8:** We know this when the learner classifies angles into acute, right, obtuse, straight, reflex or revolution;

**Assessment Standard 4.9:** We know this when the learner estimates, compares, measures and draws angles accurate to one degree using protractors.



**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.8:** We know this when the learner locates positions on co-ordinate systems (ordered grids) and maps.

Self-assessment

## **MATHEMATICS**

### **Space and Shape**

#### **EDUCATOR SECTION**

##### **Memorandum**

14

(a) 42

(b) 70

(c) 6

(d) 9

(e) 18

(f) 36

(g) 114

(h) 117

(i) 133

(j) 146

(k) 9

(l) 8

(m) 8

(n) 3

(o) 9

## Leaner Section

### Content

#### ACTIVITY: Self-assessment [LO 1.8]

##### 12.4 BRAIN-TEASER!

An aeroplane flies for 200 km in the direction of 060 degrees. Then it changes direction and flies another 480 km in the direction of 110°. Can you draw the aeroplane's route? (Hint: 1 cm = 100 km. Draw another North line when direction changes. )

##### 13. Time for self-assessment

<ul style="list-style-type: none"><li>• Tick the applicable block:</li></ul>	YES	NO
I know what “Geometry” means.	—	—
I can explain the following concepts:		
<ul style="list-style-type: none"><li>• point</li></ul>	—	—
	—	—

• line		
• line segment	—	—
• ray	—	—
• parallel lines;	—	—
• perpendicular lines	—	—
I know 3 kinds of lines.	—	—
I know the sizes of the following angles:		
• revolution	—	—
• reflex angle	—	—
• straight line	—	—
• obtuse angle	—	—

• right angle	—	—
• acute angle	—	—
I can draw angles correctly with a protractor.	—	—
I can indicate directions in degrees.	—	—

14. Let us see how you do in the following mental test.

a)  $6 \times 7 =$  \_\_\_\_\_

b)  $14 \times 5 =$  \_\_\_\_\_

c)  $54 \div 9 =$  \_\_\_\_\_

d)  $63 \div 7 =$  \_\_\_\_\_

e)  $26 - 8 =$  \_\_\_\_\_

f)  $43 - 7 =$  \_\_\_\_\_

g)  $123 - 9 =$  \_\_\_\_\_

h)  $132 - 15 =$  \_\_\_\_\_

i)  $114 + 19 =$  \_\_\_\_\_

j)  $13 + 118 + 15 =$  \_\_\_\_\_

k)  $\frac{1}{4}$  of 36 = \_\_\_\_\_

l)  $\frac{1}{3}$  of 24 = \_\_\_\_\_

m)  $\frac{1}{8}$  of 64 = \_\_\_\_\_

n)  $\frac{1}{6}$  of 18 = \_\_\_\_\_

o)  $\frac{1}{5}$  of 45 = \_\_\_\_\_

- Complete: I have ..... answers correct.

## **Assessment**

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.8:** We know this when the learner performs mental calculations involving squares of natural numbers to at least  $10^2$  and cubes of natural numbers to at least  $5^3$ .

Polygons

## **MATHEMATICS**

### **Space and Shape**

#### **EDUCATOR SECTION**

##### **Memorandum**

15.2

(a) concave

(b) concave

(c) convex

16.1

(a) rhombus

(b) trapezium

(c) octagon

(d) quadrilateral polygon

(e) hexagon

(f) heptagon

(g) pentagon

(h) parallelogram

16.2

$$\frac{(8 - 2) \times 180^\circ}{8}$$

35°

16.3 108°

## 17.1 SIMILARITIES

\* 4 equally long sides

sides//

\* diagonals half each other

\* 4 corners

## DIFFERENCES

\* angles of

rhombus not 90°

## 17.2 SIMILARITIES

\* have 2 pairs of equally long sides

\* 2 opposite sides are equally long

\* have 4 corners

\* diagonals halve (bisect) each other

## DIFFERENCES

\* angles of parallelogram not 90°

18.

(a) kite



(b) trapezium

20.2 ceilings; gates; trusses; bridges; scaffolding

## Leaner Section

### Content

#### ACTIVITY: Polygons [LO 3.1, LO 2.3]

##### 15. POLYGONS

##### 15.1 Did you know?

Geometric forms in a plane that are made up of straight lines are called polygons. These are made up of sides, angles or corners and vertices.



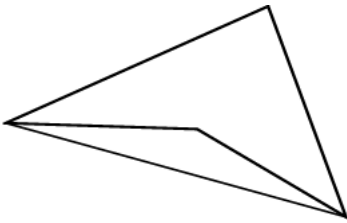
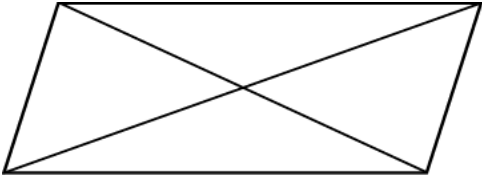
##### 15.2 Did you also know?

A polygon is convex if all the lines that join any two vertices are inside the polygon.

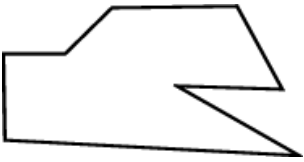
All the inner angles are either acute or obtuse angles.

The polygon will be concave if any lines that join two vertices fall outside the polygon.

Then one or more of the inside angles will be a reflex angle.



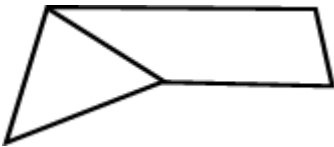
15.2.1 Are the following polygons convex or concave?



a)

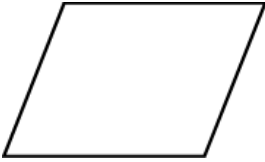
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b)



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c)



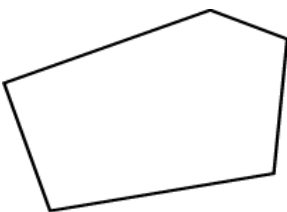
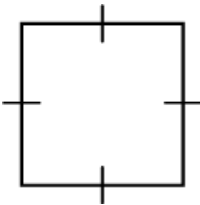
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### 15.3 Also Remember!

The sides of a regular polygon are equally long and all the angles are equally big.

The more sides a regular polygon has, the bigger the inside angles become.

The sides of an irregular polygon are all of different lengths.



### 15.4 TAKE NOTE!

We can calculate the size of the angles of a regular polygon with the help of this formula:

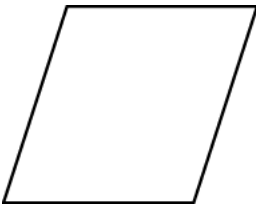
$$\text{Size of each angle} = \frac{(\text{number of sides} - 2) \times 180^\circ}{\text{number of sides}}$$

e.g. Hexagon:

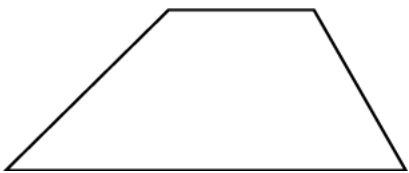
$$\begin{aligned} & \frac{(6 - 2) \times 180^\circ}{6} \\ = & \frac{4 \times 180^\circ}{6} \\ = & 120^\circ \end{aligned}$$

16.1 Work with a friend. Can you say what each of the following polygons are called? Write the name in each figure.

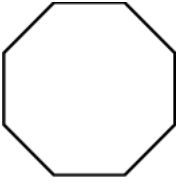
a)



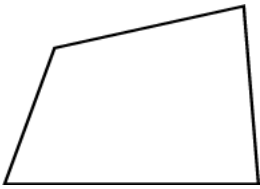
b)



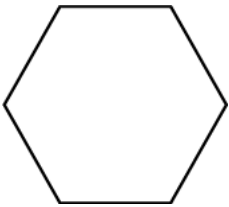
c)



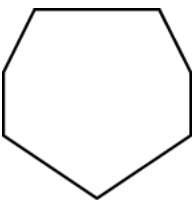
d)



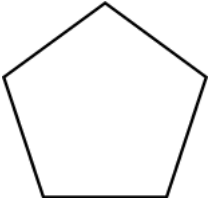
e)



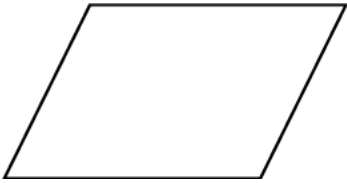
f)



g)



h)



16.2 Calculate the size of each angle of the octagon.

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16.3 What is the size of each angle of a pentagon?

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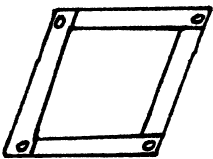
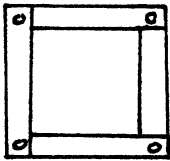
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17.1 Work in groups of three. Cut strips of thick cardboard or use ice cream sticks. Make holes at the ends and join the sticks with split pins. Build a square.

Press on one corner and change it into a rhombus.



- Now compare the square with the rhombus and see if you can complete the following table:

SIMILARITIES

between rhombus and square

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## DIFFERENCES

between rhombus and square

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17.2 From other groups of three. Follow the same instructions as for 17.1 but build a rectangle instead. If you press on a corner it will change into a parallelogram.

- Now complete the table by comparing the rectangle with the parallelogram:

## SIMILARITIES



between rectangle and parallelogram

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DIFFERENCES

between rectangle and parallelogram

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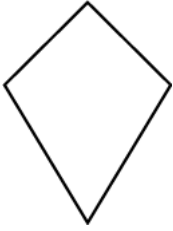
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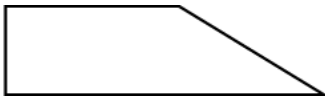
18. What do we call this geometric figure?



a)

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b)



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19. Form groups of four. Your teacher will say who must do a, b, c, and d.

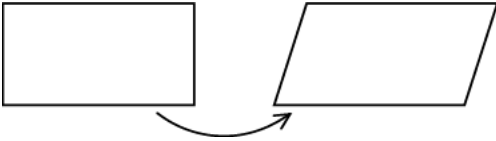
19.1 Discuss the similarities and differences between:

- a) a rhombus and a kite;
- b) a trapezium and a parallelogram;
- c) a rectangle and a trapezium;
- d) a kite and a trapezium.

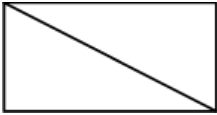
19.2 Make a poster to explain the above and report back to the class.

20. Did you know?

In maths we say a figure / structure is rigid if it can keep its original form even though pressure is applied to one of its corners, e.g.



Not sturdy



Sturdy

20.1 Divide into pairs. Use cool drink straws and build any rigid structure. See if you can build the highest structure in the class!

20.2 TAKE NOTE!

A triangle is the only polygon that is rigid. It doesn't change its form when pressure is applied to any of its corners.

Where, do you think, do engineers and builders regularly use triangles to ensure stability in their constructions?

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## 21. Time for self-assessment

<ul style="list-style-type: none"> <li>• Tick the applicable block..</li> </ul>	Uncertain	Certain
I can explain what the following are:		
<ul style="list-style-type: none"> <li>• a polygon</li> </ul>	—	—
<ul style="list-style-type: none"> <li>• a convex polygon</li> </ul>	—	—
<ul style="list-style-type: none"> <li>• a concave polygon</li> </ul>	—	—
<ul style="list-style-type: none"> <li>• a regular polygon</li> </ul>	—	—
<ul style="list-style-type: none"> <li>• an irregular polygon</li> </ul>	—	—
I know the formula to determine / calculate the size of the angles of a regular polygon	—	—
I can point out the similarities between different geometric forms.	—	—

I can point out the differences between different geometric forms.	—	—
I can build a rigid construction with cool drink straws	—	—

## Assessment

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.1:** We know this when the learner recognises, visualises and names geometric figures and solids in natural and cultural forms and geometric settings, including those previously dealt with.

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.3:** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways.

Triangles

## **MATHEMATICS**

### **Space and Shape**

#### **EDUCATOR SECTION**

##### **Memorandum**

22.3

(a) right-angled

(b) equilateral

(c) acute-angled

(d) isosceles

(e) obtuse-angled

22.4

(a) one obtuse angle

(b) 2 sides equally long

(c) 3 different lengths

(d) one angle  $90^\circ$

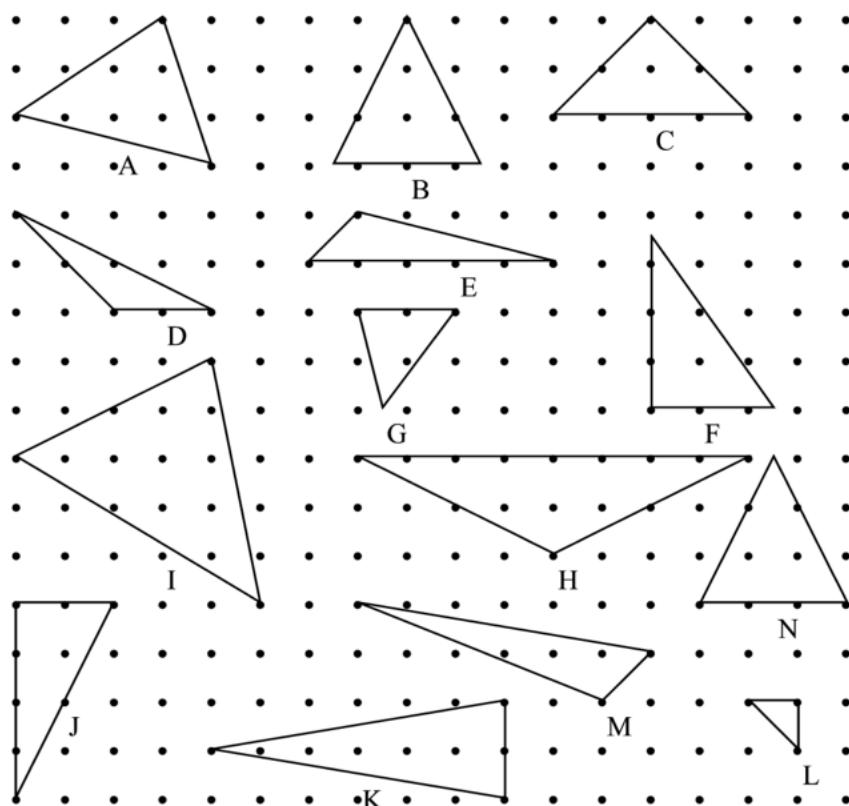
##### **Learner Section**

##### **Content**

## ACTIVITY: Triangles [LO 3.1, LO 3.2, LO 3.4, LO 4.9]

### 22. TRIANGLES

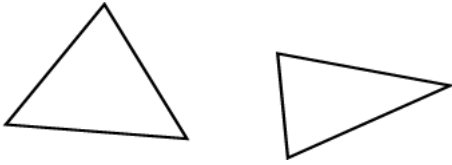
22.1 Draw the triangles shown below on graph paper. Cut them out neatly. With a friend, sort these triangles into groups. The triangles in each group must have the same characteristics. Explain to the rest of the class why you sorted the triangles into these groups.



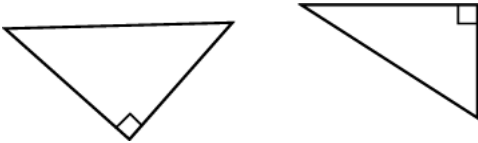
22.2 Did you know?

We can classify triangles according to their angles or their sides.

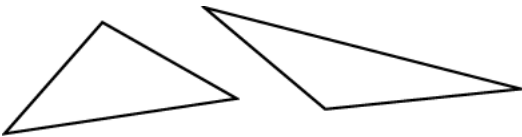
a) Acute-angled triangle



b) Right-angled triangle

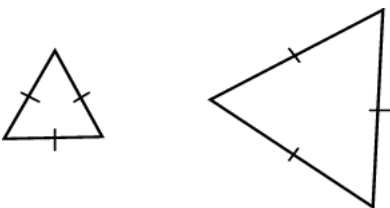


c) Obtuse-angled triangle



d) Equilateral triangle

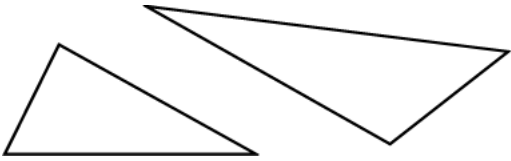
All three sides are equally long.



e) Scalene triangle

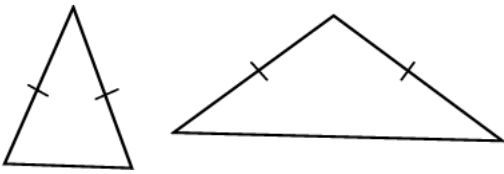
All three sides have different lengths.



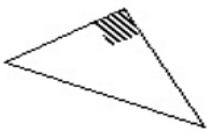


f) Isosceles triangle

There are two equally long sides.



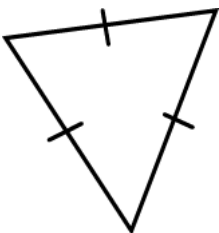
22.3 Identify the triangles shown below:



a)

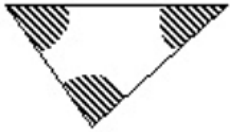
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b)



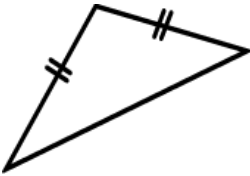
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c)



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d)



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e)



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22.4 Now draw your own:

a) Obtuse-angled triangle

b) Isosceles triangle

- c) Scalene triangle
- d) Right-angled triangle

## **Assessment**

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.1:** We know this when the learner recognises, visualises and names geometric figures and solids in natural and cultural forms and geometric settings, including those previously dealt with.

**Assessment Standard 3.2:** We know this when the learner in contexts that include those that may be used to build awareness of social, cultural and environmental issues, describes and classifies geometric figures and solids in terms of properties;

**Assessment Standard 3.4:** We know this when the learner designs and uses nets to make models of geometric solids studied up to and including this grade;

**Learning Outcome 4:** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

**Assessment Standard 4.9:** We know this when the learner estimates, compares, measures and draws angles accurate to one degree using protractors.

Symmetry

## **MATHEMATICS**

### **Space and Shape**

#### **EDUCATOR SECTION**

##### **Memorandum**

23.1... one half of a figure is identical to the other half (mirror-image)

23.2

(a);

(d)

(e)

23.4 unlimited number

##### **Leaner Section**

##### **Content**

##### **ACTIVITY: Symmetry [LO 3.5]**

23. SYMMETRY

23.1 Let us revise!

Complete: A figure is symmetrical if

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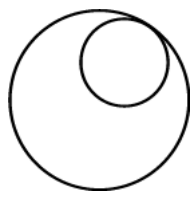
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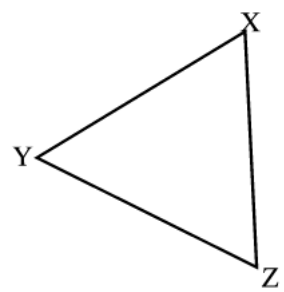
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23.2 Which of the following figures are NOT symmetrical? Draw a big cross over each one.



a)



b)

c)



d)



e)

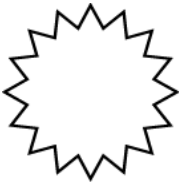
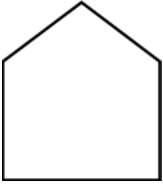


f)



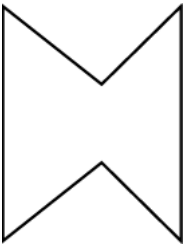
23.3 Please draw in the axis of symmetry in each figure below that is symmetrical.

a)

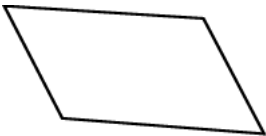


b)

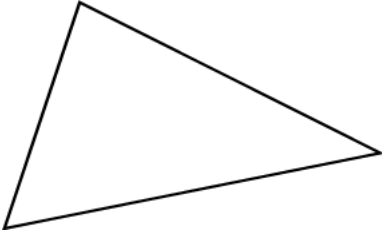
c)



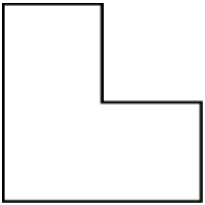
d)



e)



f)



23.4 How many axes of symmetry does a circle have?

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23.5 Look for pictures of car emblems in newspapers and magazines. Cut them out neatly and stick them in the block below. Clearly tick those emblems that are symmetrical.

## Assessment

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.5:** We know this when the learner uses transformations (rotations, reflections and translations) and symmetry to investigate (alone and/or as a member of a group or team) properties of geometric figures.



Tesselations

## **MATHEMATICS**

### **Space and Shape**

#### **EDUCATOR SECTION**

##### **Memorandum**

24.2 No, pentagons do not tessellate

26

(a) 50

(b) 105

(c) 993

(d) 995

(e) 12

(f) 12

(g) 12

(h) 7

(i) 100

(j) 100 000

(k) 5 r. 3

(l) 9 r. 5

(m) 8 r. 6

(n) 9 r. 5

(o) 7 r. 4

## Leaner Section

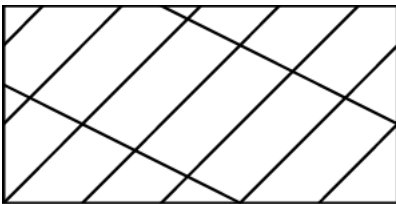
### Content

#### ACTIVITY: Tessellations [LO 1.8]

##### 24. TESSELLATIONS

###### 24.1 Did you know?

When a surface is covered by tiles so that there are no gaps left between the tiles, and no tiles overlap, the pattern that is made is called a tessellation, e.g.



We say the form tessellates.

24.2 Do you think ALL polygons will tessellate? \_\_\_\_\_ Motivate your answer.

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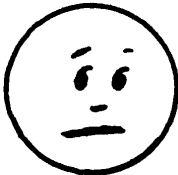

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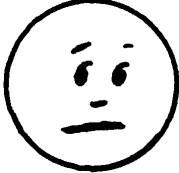


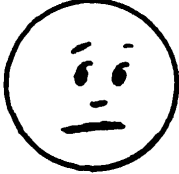


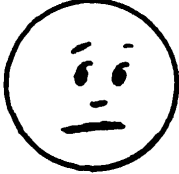


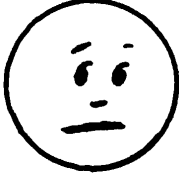


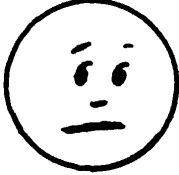


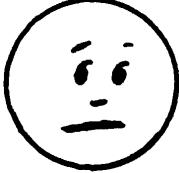

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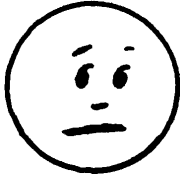


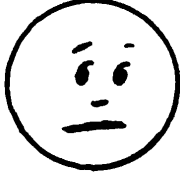


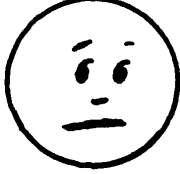


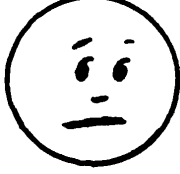

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24.3 Use a combination of polygons, e.g. a triangle and a square and design a floor covering for a kitchen or bathroom. It must tessellate! Colour it in neatly.

25. Time for self-assessment

<ul style="list-style-type: none"><li>• Colour in the face that shows your ability:</li></ul>			
I was able to group different triangles according to their characteristics.			
I can explain the following concepts:			

<ul style="list-style-type: none"> <li>• acute-angled triangle</li> </ul>			
<ul style="list-style-type: none"> <li>• equilateral triangle</li> </ul>			
<ul style="list-style-type: none"> <li>• obtuse-angled triangle</li> </ul>			
<ul style="list-style-type: none"> <li>• isosceles triangle</li> </ul>			
<ul style="list-style-type: none"> <li>• right-angles triangle</li> </ul>			
<ul style="list-style-type: none"> <li>• scalene triangle</li> </ul>			

• symmetry			
• tessellations			
I can indicate the axes of symmetry of figures.			
I can draw a pattern with shapes that tessellate.			

26. Can you improve the mark you got in the previous mental test? Try to complete this one in 2 minutes.

a)  $16 + 19 + 15 =$  \_\_\_\_\_

b)  $28 + 36 + 41 =$  \_\_\_\_\_

c)  $1\ 009 - 16 =$  \_\_\_\_\_

d)  $1\ 012 - 17 =$  \_\_\_\_\_

e) \_\_\_\_\_  $\times 8 = 96$

f)  $9 \times$  \_\_\_\_\_  $= 108$

g)  $84 \div 7 =$  \_\_\_\_\_

h)  $63 \div$  \_\_\_\_\_  $= 9$

i)  $10^5 \div 103 =$  \_\_\_\_\_

j)  $10^3 \times 102 =$  \_\_\_\_\_

k)  $43 \div 8 =$  \_\_\_\_\_

l)  $59 \div 6 =$  \_\_\_\_\_

m)  $78 \div 9 =$  \_\_\_\_\_

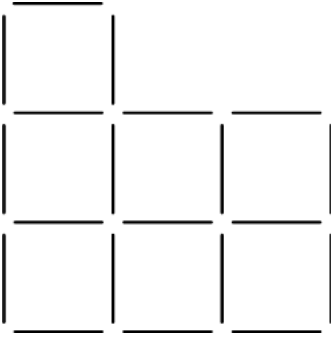
n)  $86 \div 9 =$  \_\_\_\_\_

o)  $53 \div 7 =$  \_\_\_\_\_

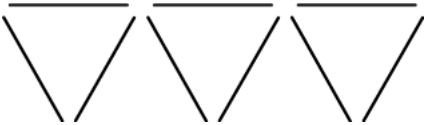
## 27. CHALLENGE!

- See if you can get the following correct

27.1 Arrange 20 toothpicks to form seven squares (see sketch). Move three toothpicks so that only five squares of the same size are left.

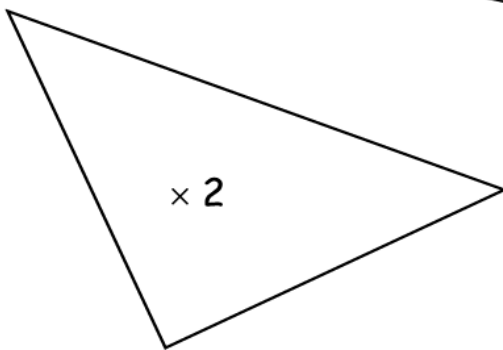
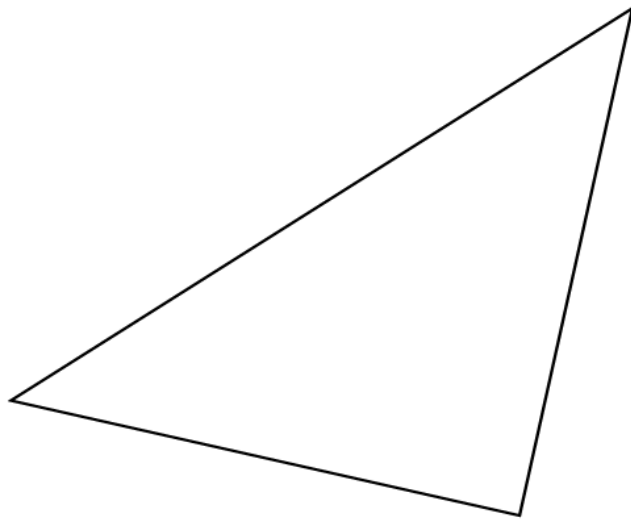
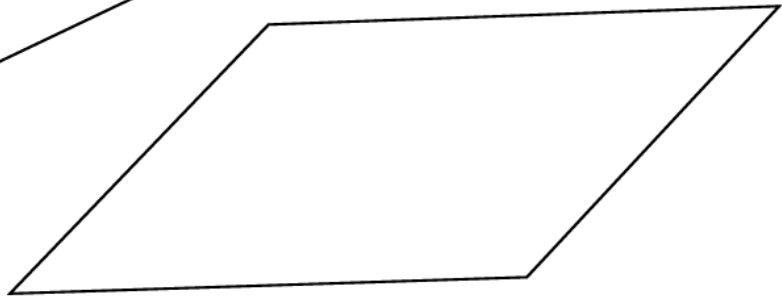
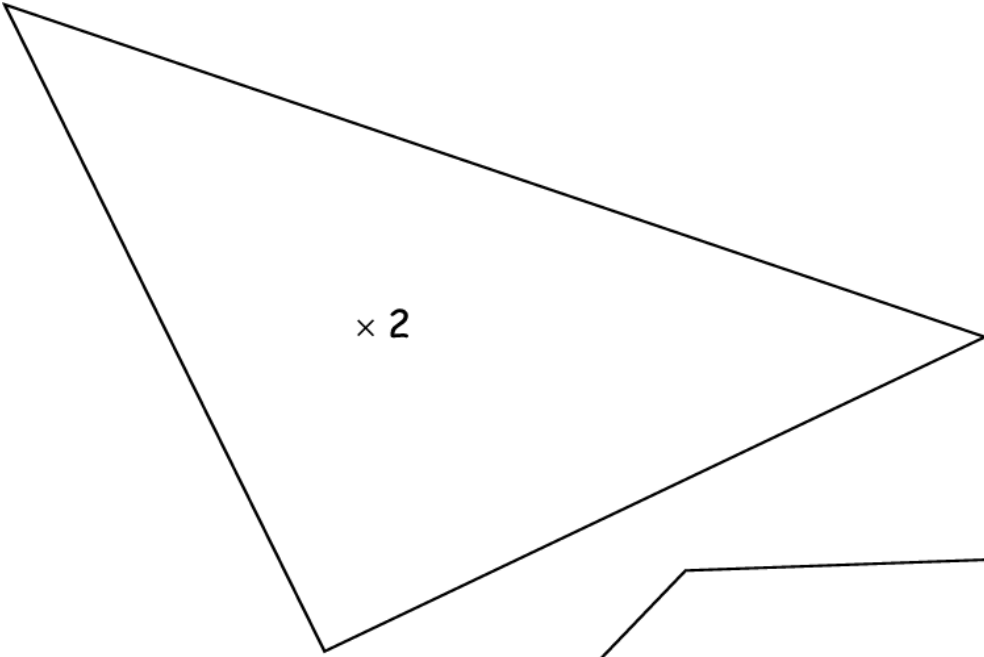


27.2 Arrange your toothpicks as shown in the example below. Move only two so that you form a parallelogram and three rhombuses.



27.3 Trace the following pieces of a tangram onto a folio sheet and cut them out neatly. (You may use a tangram if you have one in the class.)

Use all the pieces and build a cat in as many different ways as possible!





## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.8:** We know this when the learner performs mental calculations involving squares of natural numbers to at least  $10^2$  and cubes of natural numbers to at least  $5^3$ .

MODULE TEST

MODULE TEST

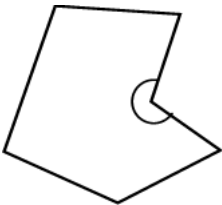
1. Join the correct answer in column B with the definition in column A:

A		B
The shortest possible line		Ray
Has no beginning or end point		Plane
Has a beginning point but stretches out indefinitely		Point
Has length and breadth but no height		Straight line

(4)

2. Name the following angles.

a)



.....



b)

.....

c)



.....

(3)

3. An aeroplane flies for 400 km in the direction of 040 degrees. It then changes direction and flies a further 300 km in the direction of 125 degrees. Draw the aeroplane's route. 1 cm = 100 km.

(2)

4. True or false?

a) This polygon is convex. \_\_\_\_\_

b) At least one of the inner angles of a concave polygon is a reflex angle.

\_\_\_\_\_

c) A triangle is rigid. \_\_\_\_\_

d) An irregular polygon's sides are all equally long. \_\_\_\_\_



(4)

5. Calculate the size of each corner of a regular heptagon by using the formula you learnt.

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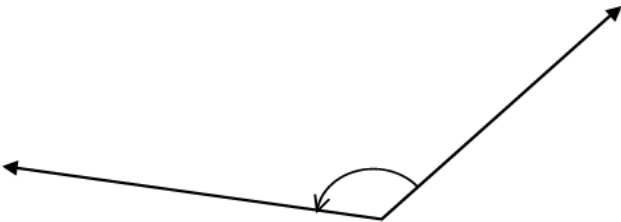
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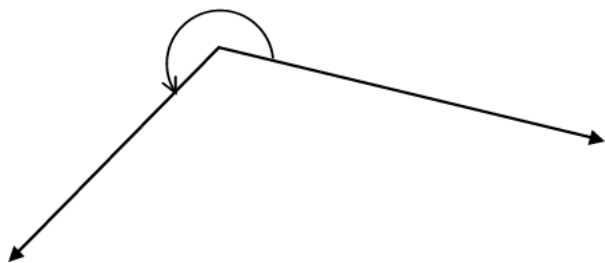
(4)

6. Measure the following angles with your protractor.



a)

.....

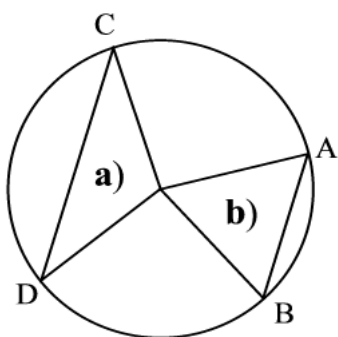


b)

.....

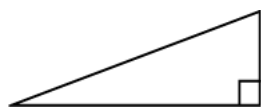
(2)

7. What kind of triangles are each of the following?



a) .....

b) .....



c) .....

3)

8. A figure is symmetrical if

---

---

---

---

---

---

(1)

9. Draw a polygon with four axes of symmetry. Show each axis with a broken line.

(3)

10. Use broken lines and show how you would make a pentagon sturdy.

(1)

11. Draw any figure that tessellates in the block below.

(1)

Revising

## **MATHEMATICS**

### **Perimeter, Area and Volume**

## **EDUCATOR SECTION**

### **Memorandum**

1.

a) Yes

b) Yes

c) Yes

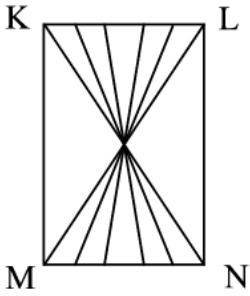
## **LEARNER SECTION**

### **Content**

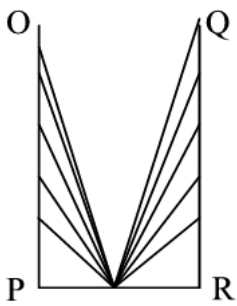
#### **ACTIVITY: Revising [LO 3.3, LO 3.7]**

1. Why don't we start by revising a bit? Get your thinking caps on!

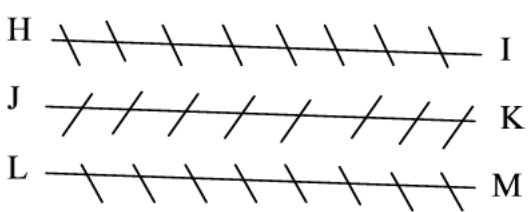
a) Are KL and MN parallel?



b) Is OP equidistant from QR?

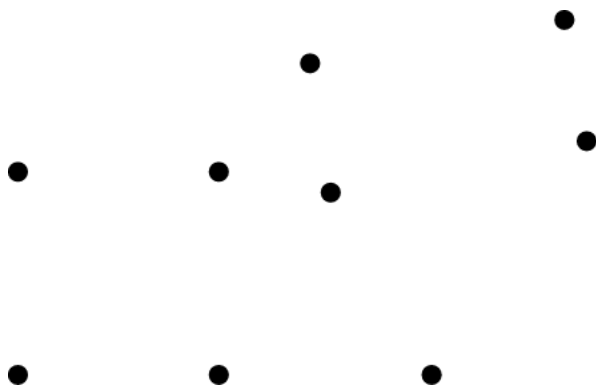


c) Are the following three line segments equally spaced from each other?

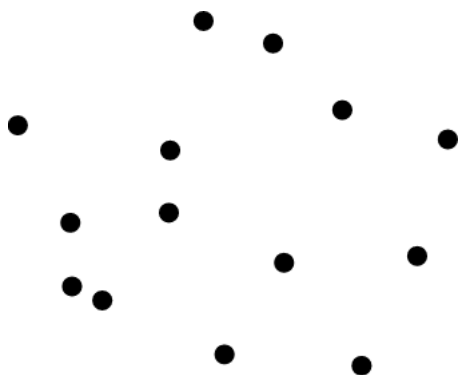


1.4 Use the dots as corners and draw an equilateral triangle, a square and a rectangle.





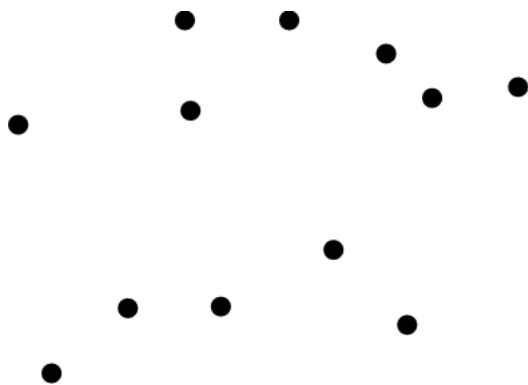
1.5 Join the dots together so that you will form a parallelogram and a rhombus.



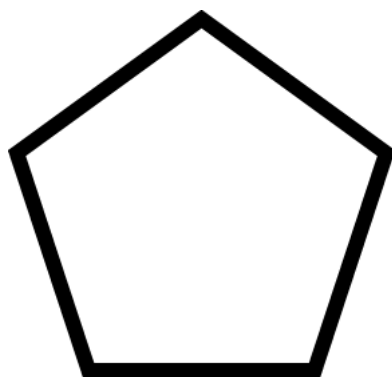
1.6 Use the dots as corners and draw:

- a) two triangles of the same shape and size
- b) an equilateral triangle
- c) a right-angled triangle

(You must use all the dots and you may use each dot only once).



1.7 Draw in all the diagonals of this regular pentagon. Then colour in the only polygon that has been formed.



2. See if you can draw the following (use your protractor and ruler):

2.1 Draw a pentagon where each side is 50 mm long and each corner angle is 108 degrees.

2.2 Draw an octagon where each side is 40 mm long and each corner angle is 135 degrees.

## Assessment

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

***Assessment Standard 3.3:*** We know this when the learner uses a pair of compasses, ruler and protractor to accurately construct geometric figures for investigation of own property and design of nets.

***Assessment Standard 3.7:*** We know this when the learner draws and interprets sketches of solids from different perspectives.

Perimeter

## MATHEMATICS

### Perimeter, Area and Volume

#### EDUCATOR SECTION

#### Memorandum

3.2

250 mm

320 mm

3.3

a) 135 mm

b) 135 mm

c) 104 mm

d) 174 mm

3.4

a)  $area = 2 \times (b + d)$  or  $area = (2 \times b) + (2 \times d)$

b)  $area = 2 \times (f + g)$  or  $area = (2 \times f) + (2 \times g)$

c)  $area = 4 \times k$

d)  $area = (2 \times a) + (2 \times e)$  or  $area = 2 \times (a + e)$

3.5

By means of a piece of string or wool

3.6

a) 3 100 km

b) 500 km

c) 350 km

d) 15,45 h

38.

a) 42

b) own answer

c) R2,681,70

5.

a) 27

b) 27

c) 39

d) 18

e) 18

f) 9

g) 14

h) 2

i) 12

j) 60

k) 60

l) 64

m) 72

n) 125

o) 108

## **LEANER SECTION**

### **Content**

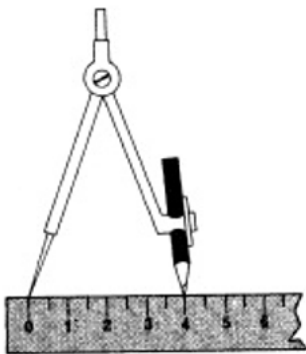
**ACTIVITY: Perimeter [LO 2.5, LO 4.2, LO 4.3, LO 1.8]**

#### **3. PERIMETER**

##### **3.1 IMPORTANT to REMEMBER!**

The perimeter of any figure is the total length around a figure, in other words the sum of the lengths of all the sides.

Perimeter is thus a length and is measured in millimetres, metres or kilometres. The most accurate method to determine perimeter is to use compasses and a ruler.



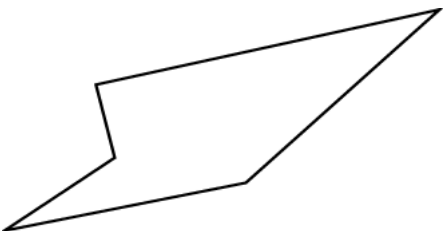
3.2 What is the perimeter of your pentagon and octagon above?

Pentagon:

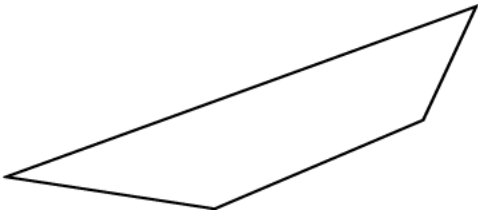
Octagon:

3.3 Use your ruler and determine the perimeter of the following polygons:

a)



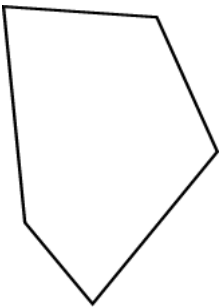
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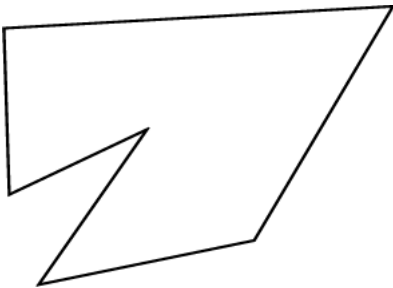
b)

---

c)



---



d)



---

3.4 Work together with a friend. Work out formulas to determine the perimeters of the following quadrilaterals:

a) A rectangle with a length of  $b$  centimetres and breadth of  $d$  centimetres:

---

---

---

---

b) A parallelogram with sides  $f$  centimetres and  $g$  centimetres:

---

---

---

---

c) A rhombus with sides  $k$  millimetres:

---

---

---

---

d) A kite with sides  $a$  millimetres and  $e$  millimetres:

---

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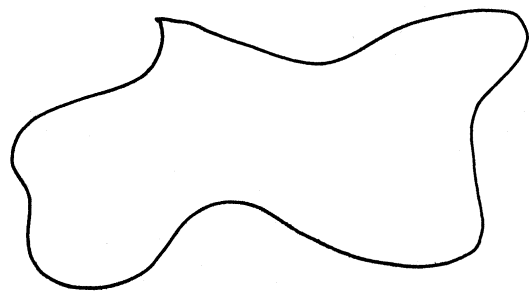
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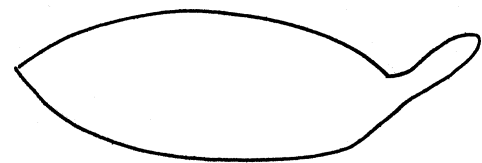
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3.5 How will you determine the perimeter of the following figures?

a)



b)



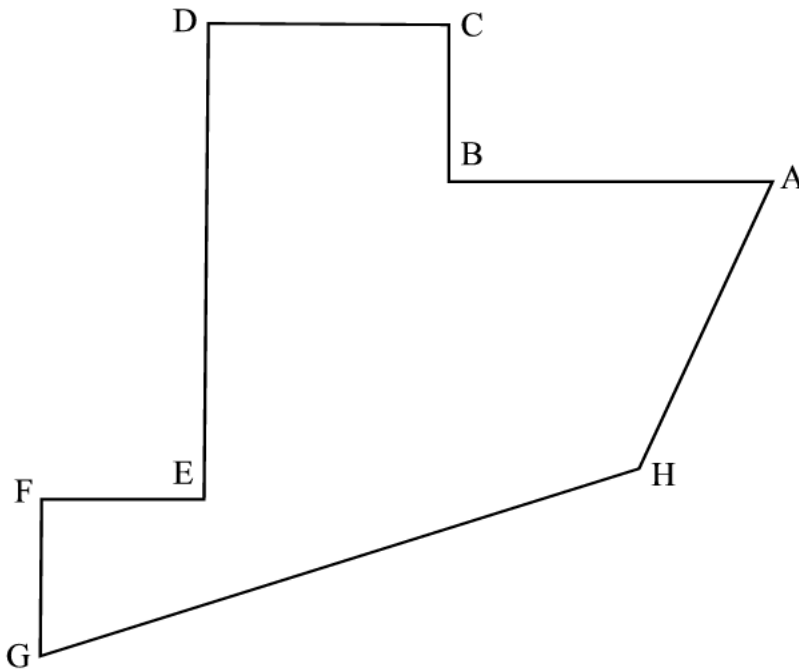
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a) Look at the accompanying sketch and use the scale to find out how far they will travel.


$$1 \text{ cm} = 100 \text{ km}$$

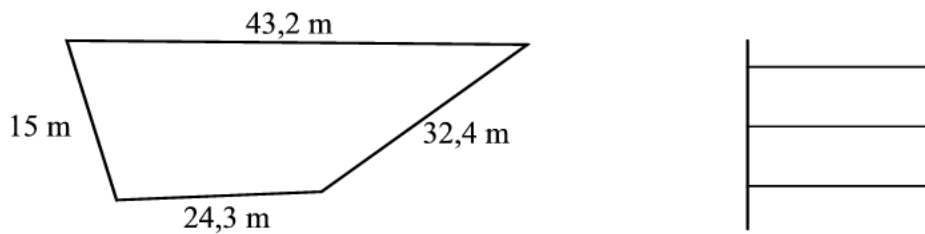
c) What is the actual distance from B to D?

c) If the bus travels at 110 km/h, how long will it take for the bus to travel from A to F if it doesn't stop along the way?

---

---

3.8 The sketch shows a camp for sheep that needs to be fenced.



a) If the horizontal poles are 2,7 m long, and you leave an opening of 1,5 m for a gate, how many upright poles are you going to need?

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---

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---

b) Where are you going to leave an opening for a gate? Motivate your answer.

---

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---

---

c) If the upright poles cost R63,85 each, how much will the farmer have to spend?

---

---

---

#### 4. Time for self-assessment

<ul style="list-style-type: none"><li>• Tick the applicable block:</li></ul>	Yes	No
I could find solutions to the brainteasers.		
I was able to draw a regular pentagon.		
I was able to draw a regular octagon.		
I can explain the concept “perimeter”.		
I could calculate accurately the perimeter of the polygons.		
I was able to formulate and write down the formulas for perimeter of the following:		
<ul style="list-style-type: none"><li>• rectangle</li></ul>		
<ul style="list-style-type: none"><li>• parallelogram</li></ul>		
<ul style="list-style-type: none"><li>• rhombus</li></ul>		

• kite		
I was able to calculate accurately, according to scale, the distance that the Grade 7's would have covered on their tour.		
I was able to correctly calculate the number of poles that the farmer needed for his camp.		

5. Let us test your mental maths now!

Complete the following as quickly and accurately as possible:

a)  $6 + 7 \times 3 = \dots\dots\dots$

b)  $6 + (7 \times 3) = \dots\dots\dots$

c)  $(6 + 7) \times 3 = \dots\dots\dots$

d)  $9 \times 6 \div 3 = \dots\dots\dots$

e)  $9 \times (6 \div 3) = \dots\dots\dots$

f)  $36 \div (12 \div 3) = \dots\dots\dots$

g)  $13 - 5 + 6 = \dots\dots\dots$

h)  $13 - (5 + 6) = \dots\dots\dots$

i)  $14 - (5 - 3) = \dots\dots\dots$

j)  $4 \times 3 \times 5 = \dots\dots\dots$

k)  $5 \times (3 \times 4) = \dots\dots\dots$

l)  $43 = \dots\dots\dots$

m)  $32 \times 23 = \dots\dots\dots$

n)  $53 = \dots\dots\dots$

o)  $33 \times 22 = \dots\dots\dots$

- Complete by colouring:

I did	WELL		REASONABLY		NOT SO WELL	
----------	------	--	------------	--	----------------	--

## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.5:** We know this when the learner solves or completes number sentences by inspection or by trial-and-improvement, checking the solutions by substitution (e.g.  $2 \times - 8 = 4$ ).

**Learning Outcome 4:** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

**Assessment Standard 4.2:** We know this when the learner solves problems;

**Assessment Standard 4.3:** We know this when the learner solves problems using a range of strategies;

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

***Assessment Standard 1.8:*** We know this when the learner performs mental calculations involving squares of natural numbers to at least  $10^2$  and cubes of natural numbers to at least  $5^3$ .



Area

## **MATHEMATICS**

### **Perimeter, Area and Volume**

#### **EDUCATOR SECTION**

##### **Memorandum**

a)

(i) 9

(ii) 13

(iii) 16

b)

(i) 9 cm

(ii) 13 cm

(iii) 16 cm

- area of square = length x 4

8.

a) 28 m; 45 m<sup>2</sup>

b) 6 cm

c) 4 km; 24 km

d) 7 cm; 28 cm<sup>2</sup>

e) 11 m; 11 m

9.2

a) 15 000; 1.5

b) 37 500; 3,75

c) 24 000; 2,4

9.3

a) 15 000 000; 15

b) 9 000 000; 9

c) 37 500 000; 37,5

## **LEANER SECTION**

### **Content**

#### **ACTIVITY: Area [LO 4.2, LO 2.5, LO 2.3]**

#### **6. AREA**

##### **6.1 IMPORTANT to KNOW!**

The area of a figure is the size of the flat surface that is included within the outside boundary of a figure. If you sweep your hand over this whole page, you have touched the whole surface of the page. If you paint a wall, we call the amount of space you have painted, the area.

##### **6.2 Also IMPORTANT to REMEMBER:**

Area is expressed in square units, e.g. square centimetre (cm<sup>2</sup>) or square metres (m<sup>2</sup>).

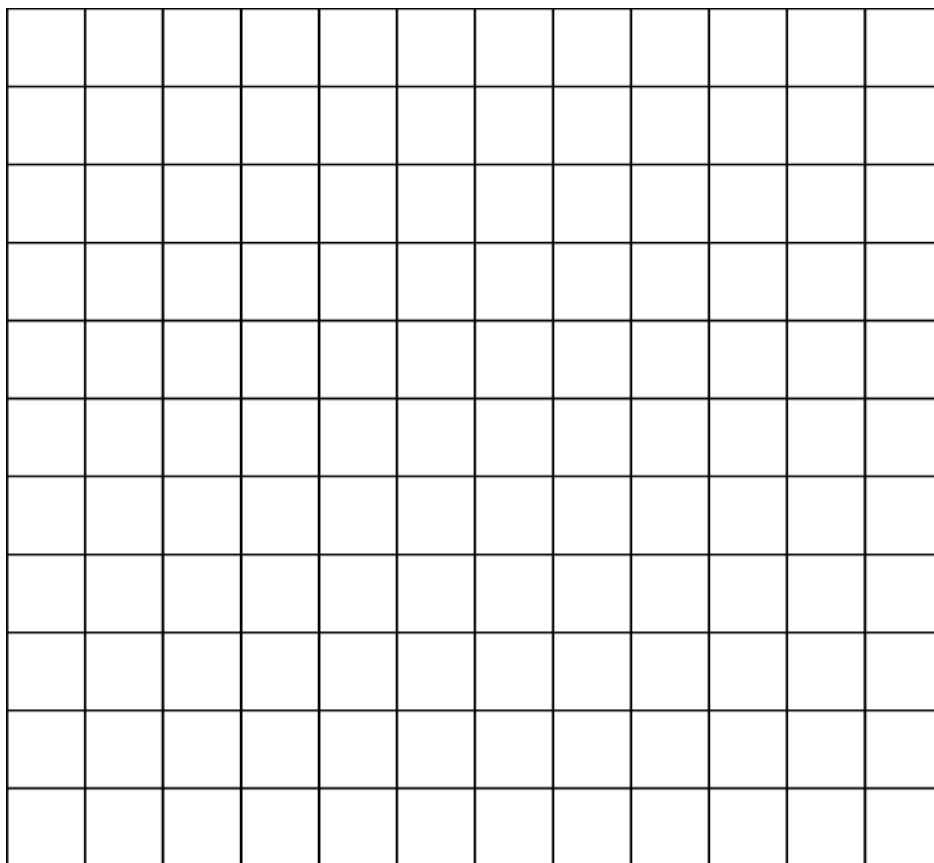
6.3 Memorise the following:

$$1 \text{ cm}^2 = 10 \text{ mm} \times 10 \text{ mm} = 100 \text{ mm}^2$$

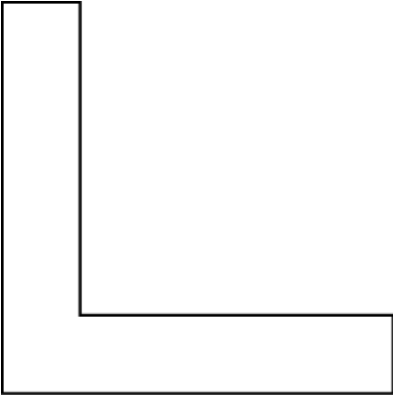
$$1 \text{ m}^2 = 100 \text{ cm} \times 100 \text{ cm} = 10\,000 \text{ cm}^2$$

$$1 \text{ km}^2 = 1\,000 \text{ m} \times 1\,000 \text{ m} = 1\,000\,000 \text{ m}^2$$

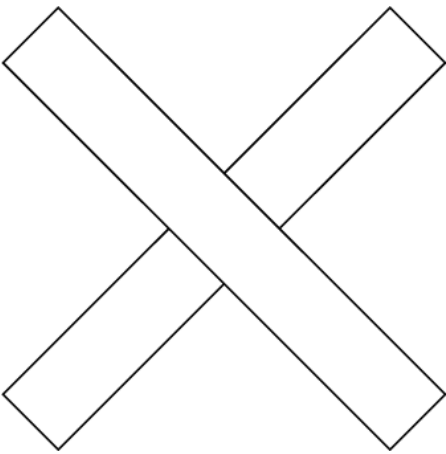
6.4 Ask your educator to photostat the following page or trace it just as it is:



a) Cut out the small squares and see how many of them will fit in the following figures.

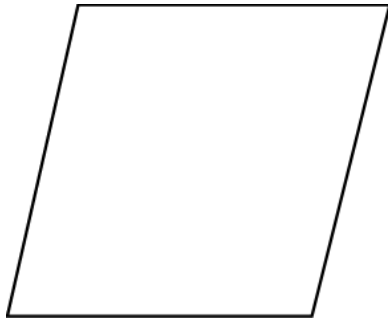


(i)



(ii)





(iii)

---

b) What is the area of :

figure (i)? \_\_\_\_\_

figure (ii)? \_\_\_\_\_

figure (iii)? \_\_\_\_\_

6.5.1 There is a quicker way to find out the area of figures!

We can use formulas,

e.g. rectangle

= length x breadth

=  $5 \times 2$

=  $10 \text{ cm}^2$

6.5.2 Can you write down a formula that will determine the area of a square?

---

7. Can you draw two different rectangles, each having an area of  $48 \text{ cm}^2$ ?

8. Work together with a friend and complete the following table:

	Length	Breadth	Perimeter	Area
E.g.	5 cm	3 cm	16 cm	15 cm <sup>2</sup>
a)	9 m	5 m	_____	_____
b)	6 cm	_____	24 cm	36 cm <sup>2</sup>
c)	8 km	_____	_____	32 km <sup>2</sup>
d)	_____	4 cm	22 cm	_____
e)	_____	_____	44 m	121 m <sup>2</sup>

9.1 Did you know?

The area of farms is calculated in hectares (ha).

$$1 \text{ ha} = 100 \text{ m} \times 100 \text{ m}$$

$$= 10\,000 \text{ m}^2$$

9.2 Use your calculator and complete the following table:

	Lengthm	Breadthm	Aream <sup>2</sup>	Hectaresha

E.g.	100	100	10 000	1
a)	150	100	_____	_____
b)	250	150	_____	_____
c)	120	200	_____	_____

9.3 Complete the following with the help of your calculator:

	Lengthm	Breadthm	Aream <sup>2</sup>	Areakm <sup>2</sup>
E.g.	2 000	500	1 000 000	1
a)	5 000	3 000	_____	_____
b)	1 500	600	_____	_____
c)	7 500	5 000	_____	_____

## Assessment

**Learning Outcome 4:** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

**Assessment Standard 4.2:** We know this when the learner solves problems;

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

***Assessment Standard 2.3:*** We know this when the learner represents and uses relationships between variables in order to determine input and/or output values in a variety of ways.

***Assessment Standard 2.5:*** We know this when the learner solves or completes number sentences by inspection or by trial-and-improvement, checking the solutions by substitution (e.g.  $2x - 8 = 4$ ).



Area (Brain-teaser)

## **MATHEMATICS**

### **Perimeter, Area and Volume**

#### **EDUCATOR SECTION**

##### **Memorandum**

10.

a) Yes, area of all three figures the same

b)  $\text{area} = (\text{half of base}) \times \text{height}$

11.1 1 867 km<sup>2</sup>

11.2 530 m<sup>2</sup>

11.3 9 m by 8 m

12.

13.1

a) 3 and a quarter square cm

b) 5 square cm

13.2 A

14.1

a) 64 cm<sup>2</sup>

b) 180 cm<sup>2</sup>

c)  $81 \text{ m}^2$

d)  $200 \text{ m}^2$

14.2

a)  $42 \text{ m}^2$

b)  $48 \text{ cm}^2$

c)  $65 \text{ cm}^2$

d)  $64 \text{ m}^2$

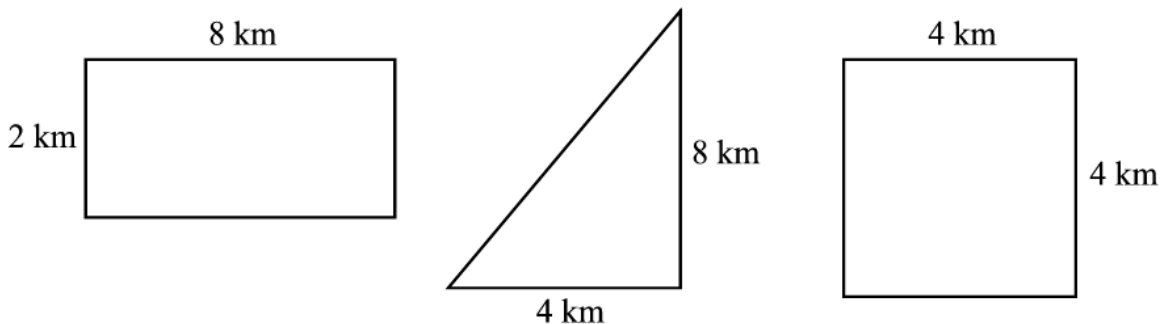
## LEANER SECTION

### Content

**ACTIVITY: Area (Brain-teaser) [LO 4.2, LO 1.9, LO 4.5]**

#### 10. BRAIN-TEASER!

A farmer divides his land as follows among his three children:



a) Was the farmer fair? \_\_\_\_\_ Motivate your answer:

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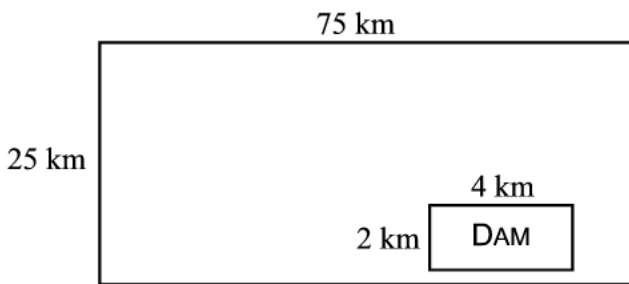
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b) From the above example, can you work out a formula that we use to determine the area of a triangle?

---

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11.1 Calculate the area of the farmer's farm without the dam.



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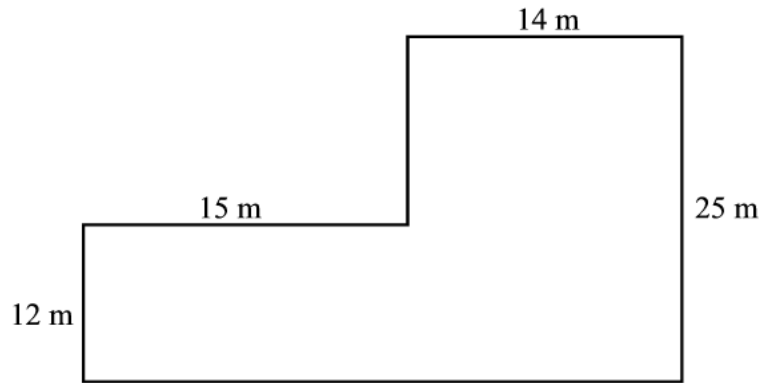
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11.2 What is the area of this lucerne camp on the farmer's farm?



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11.3 The farmer wants to fence a rectangular camp with an area of  $72\text{m}^2$ . Problem: The perimeter must be kept to the minimum (because of the cost of the wire). What will the measurements of the camp be?

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12. A rectangular rugby field has a length of 110 m and a breadth of 60 m. What will it cost to plant grass which costs R6,45 per square metre?

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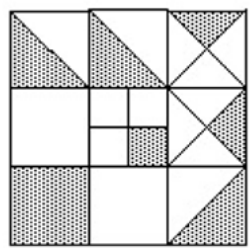
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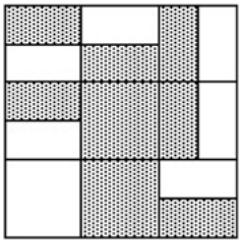
13.1 If each square is 1 cm<sup>2</sup>, what is the area of the shaded section?



a)

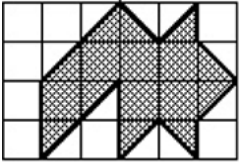
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b)



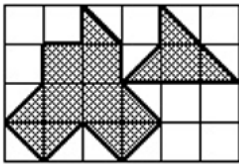
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13.2 Which figure has the biggest area: A or B?



A

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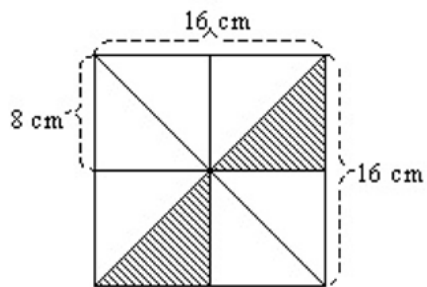
B

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## 14. BRAINTEASERS!

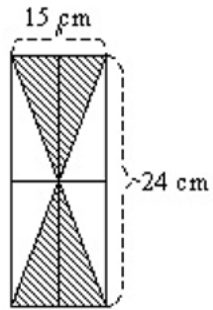
- Work with a friend.

14.1 Can you determine the area of the shaded parts of each figure?

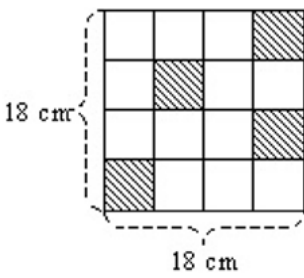


a)

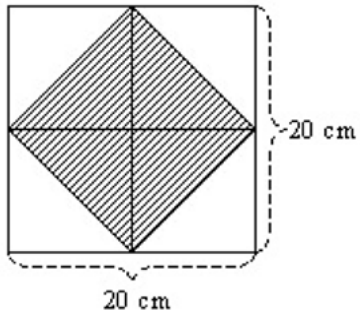
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b)



d)



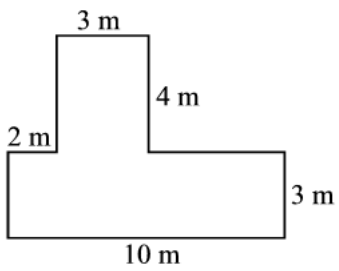
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14.2 Calculate the areas of the following figures?

a)



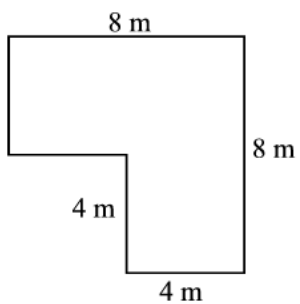
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b)

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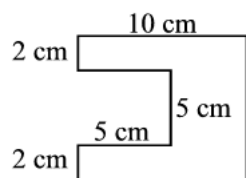
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c)

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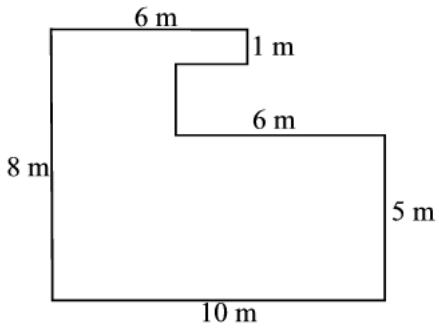
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d)

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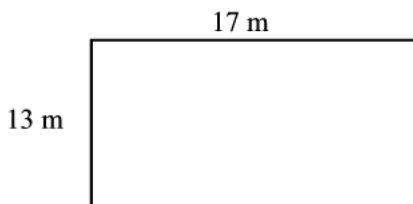
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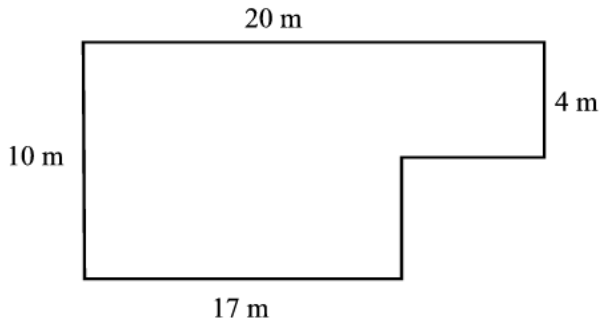
## 15. CLASS DISCUSSION

- Let us discuss the following as a class:

15.1 Your school wants to build a new computer centre. The two possible plans that have been drawn up look like this:

A



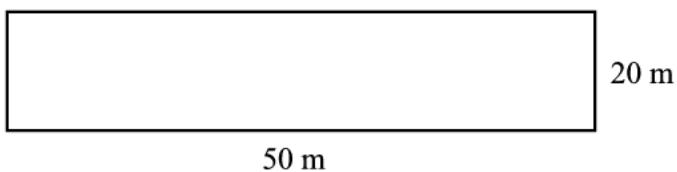


B

- Discuss:

- Which plan would use the most bricks? Why?
- Which plan would accommodate the most computers? Motivate.
- Which plan will be the most expensive to build? Why?

15.2 A plan for a swimming pool for the school has also been drawn up:



- What will happen to the area if the perimeter stays the same, BUT:
  - the length increases and the breadth decreases?
  - the length decreases and the breadth increases?
- When would the swimming pool have a maximum area?

## Assessment

***Learning Outcome 4:*** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

***Assessment Standard 4.2:*** We know this when the learner solves problems;

***Assessment Standard 4.5:*** We know this when the learner calculates, by selecting and using appropriate formulae.

***Learning Outcome 1:*** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

***Assessment Standard 1.9:*** We know this when the learner uses a range of techniques to perform calculations.

Area of irregular figures

## **MATHEMATICS**

### **Perimeter, Area and Volume**

## **EDUCATOR SECTION**

### **Memorandum**

- Bigger than a half + smaller than a half make 1 square, and the squares bigger than a half have been counted already

19.

a) 30

b) 40

c) 25

d) 35

e) 4 986

f) 2,51

g) 308

h) 71,2

i) 10

j) 40

k) 120

l) 1,743

m) 186

n) 1 528

o) 8,249

## LEANER SECTION

### Content

**ACTIVITY: Area of irregular figures [LO 4.2, LO 2.5, LO 2.3]**

#### 16. AREA OF IRREGULAR FIGURES

16.1 a) Work together with a friend. How will you determine the area of this figure? Assume that every square is 1 cm<sup>2</sup>.

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b) Now use your method and determine the area!

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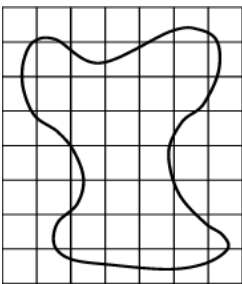
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16.2 Did you know?

With irregular figures, we can only determine an approximate area. We do it by counting all the whole squares within the figure. We also count all the squares that are bigger than half a square and add it to the first total. The squares that are smaller than half a square are not counted. Can you give a reason for this?

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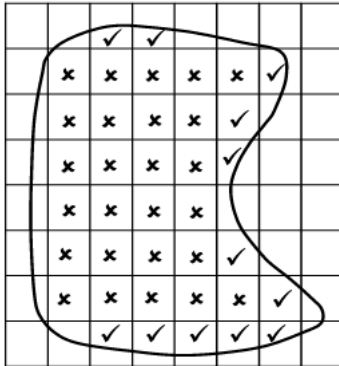
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This is how we express the approximate area in  $\text{cm}^2$ .



e.g.

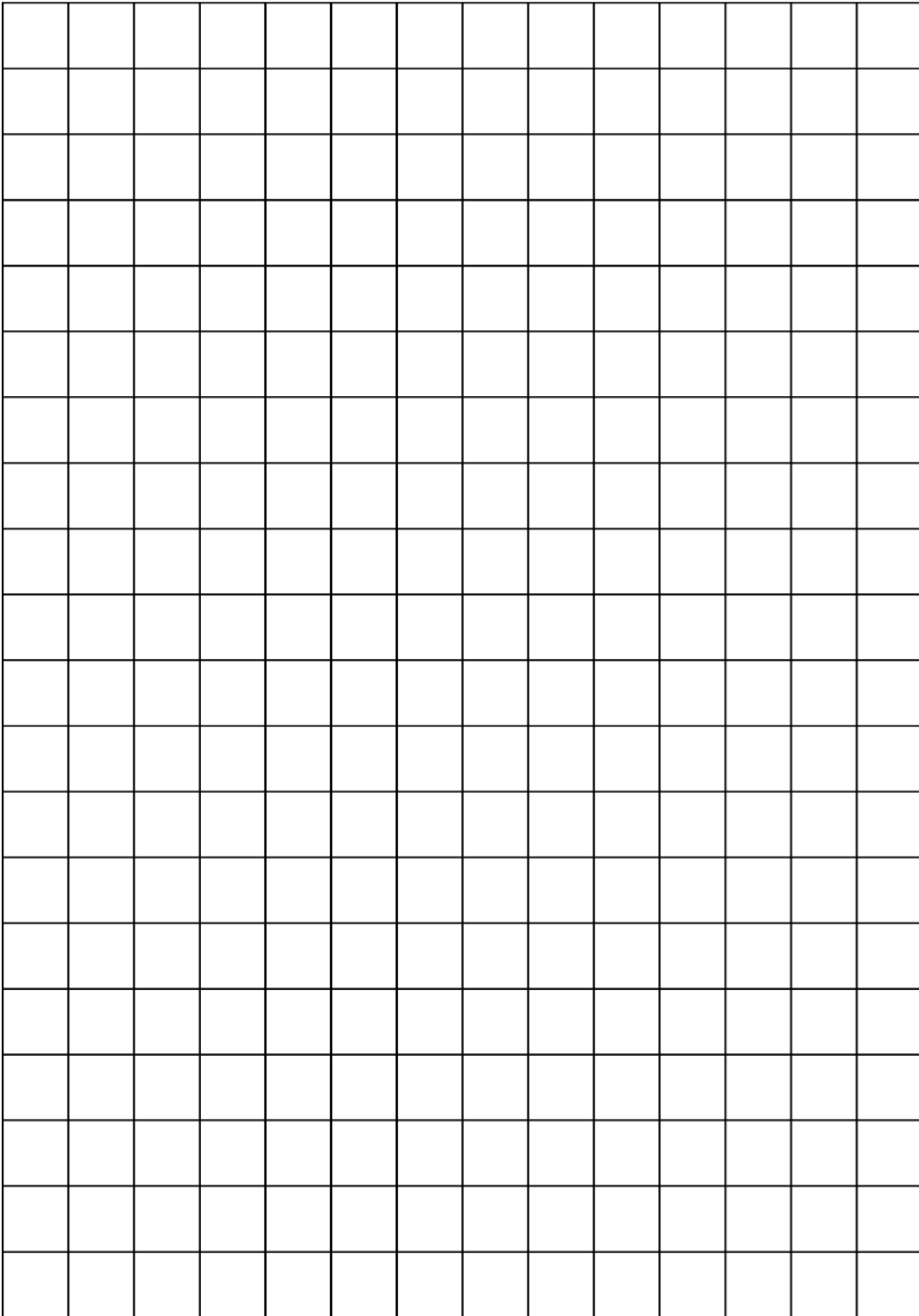
Whole squares : 26

Squares bigger than half : 12

Approximate area :  $38 \text{ cm}^2$

16.3 Now draw the outline of your hand on the squared paper below.  
Assume that each square is  $1 \text{ cm}^2$ .





a) Calculate the approximate area of your hand.

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b) Which learner's hand covered the biggest area?

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c) Which learner's hand covered the smallest area?

---

17 Time for self-assessment

<ul style="list-style-type: none"><li>• Tick the applicable column:</li></ul>	Un-certain	Reasonably certain	Certain
I can explain the concept "area".			
I can convert $\text{cm}^2$ to $\text{mm}^2$ and vice versa.			
I can convert $\text{m}^2$ to $\text{cm}^2$ and vice versa.			
I can convert $\text{km}^2$ to $\text{m}^2$ and vice versa.			
I can convert $\text{m}^2$ to hectare and vice versa.			
I know the formulas to determine the areas of the following figures:			

• square			
• rectangle			
• triangle			
I can determine the area of regular figures.			
I can determine the approximate areas of irregular figures.			

### 18.1 Let us play a game!

You need a friend, two dice, paper and a pencil. Player A is the “perimeter” and player B is the “area”. You are both “rectangles” and work in cm.

Player A throws the two dice and then works out the perimeter of a rectangle with the two numbers, e.g. 6 and 2.

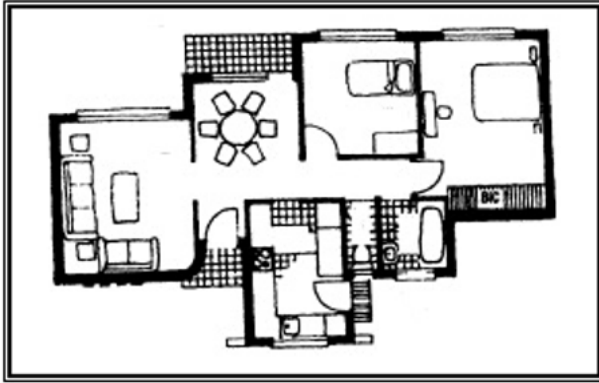
$$(6 \times 2) + (2 \times 2) = 16 \text{ cm}$$

Player B calculates the area with the same numbers:  $6 \times 2 = 12 \text{ cm}^2$

The perimeter is greater, thus player A gets two points. Take turns. The player who gets the most points after 15 rounds is the winner.

### 18.2 CHALLENGE!

a) Look carefully at this example of a house plan.



b) Now draw your own plan of a house as simply as possible.

c) What is the area of the floor surface of your house?

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d) How big is your yard?

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e) What is the perimeter of your garage(s)?

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f) If you sell your house for half a million rand, what will the cost be per  $\text{m}^2$ ?

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g) If your parents build on another room 6,1 m by 3,5 m, what will the area of your house then be?

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19. Let us now see if you can improve on the results of your previous mental test.

Complete the following as quickly and accurately as possible:

a)  $0,6$  of  $50 =$  \_\_\_\_\_

b)  $0,8$  of  $50 =$  \_\_\_\_\_

c)  $50\%$  of  $50 =$  \_\_\_\_\_

d)  $70\%$  of  $50 =$  \_\_\_\_\_

e)  $4,986 \times 1\,000 =$  \_\_\_\_\_

f)  $0,251 \times 10 =$  \_\_\_\_\_

g)  $3,08 \times 100 =$  \_\_\_\_\_

h)  $7,12 \times 10 =$  \_\_\_\_\_

i)  $25\% \times 40 =$  \_\_\_\_\_

j)  $100\% \times 40 =$  \_\_\_\_\_

k)  $300\% \times 40 =$  \_\_\_\_\_

l)  $174,3 \div 100 =$  \_\_\_\_\_

m)  $18,6 \div 0,1 =$  \_\_\_\_\_

n)  $15,28 \div 0,01 =$  \_\_\_\_\_

o)  $8\,249 \div 1\,000 =$  \_\_\_\_\_

Did you improve? \_\_\_\_\_

## Assessment

***Learning Outcome 4:*** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

***Assessment Standard 4.2:*** We know this when the learner solves problems;

***Assessment Standard 4.5:*** We know this when the learner calculates, by selecting and using appropriate formulae.

***Learning Outcome 1:*** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

***Assessment Standard 1.8:*** We know this when the learner performs mental calculations involving squares of natural numbers to at least  $10^2$  and cubes of natural numbers to at least  $5^3$ .

Three dimensional objects

## **MATHEMATICS**

### **Perimeter, Area and Volume**

#### **EDUCATOR SECTION**

##### **Memorandum**

20.3.2

a) sphere

pyramid

cube

cylinder

triangular prism

cone

hexagonal prism

c) b) 8; 12; 6

c) 5; 8; 5

d) 6; 10; 6

e) 12; 18; 8

f) 6; 9; 5

d) a) right-angled or rectangular prism

- b) cube
- c) pyramid
- d) pentagonal pyramid
- e) hexagonal prism

## LEARNER SECTION

### Content

#### ACTIVITY: Three dimensional objects [LO 3.1, LO 3.2]

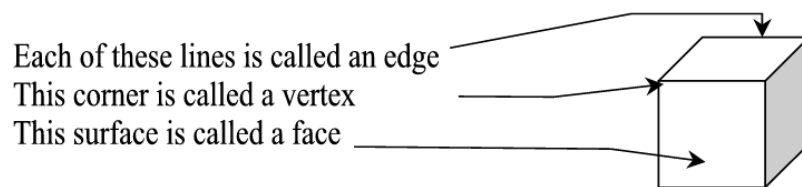
##### 20. THREE DIMENSIONAL OBJECTS

###### 20.1 Did you know?

Two-dimensional objects have only two dimensions, namely length and breadth, that enable us to calculate perimeter and area.

Three-dimensional objects have three dimensions: length, breadth and height, which enable us to calculate volume.

###### 20.2 Did you also know?



###### 20.3 Let us look at a few dimensional objects:

###### 20.3.1 Interesting to know!




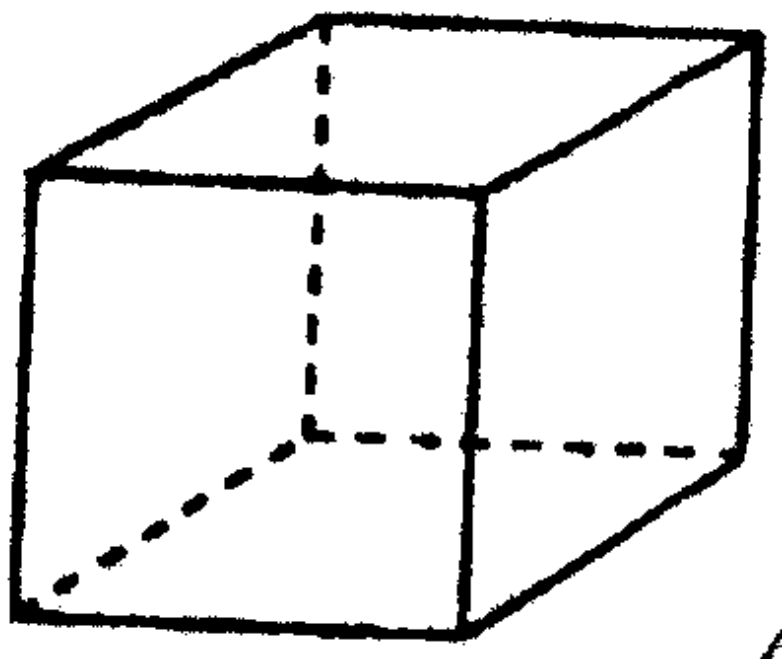
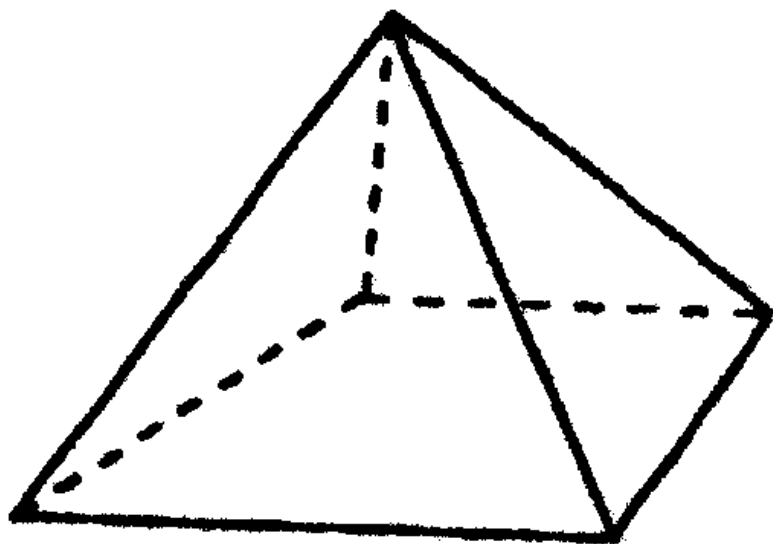
Three-dimensional figures are also known as cubic figures. Some figures have four or more faces (see sketch above) and are called polyhedrons.

The word polyhedron is Greek, which means many edges. The first polyhedrons were discovered more than 2 000 years ago by a Greek Mathematician, Euclid.

20.3.2 Work with a friend

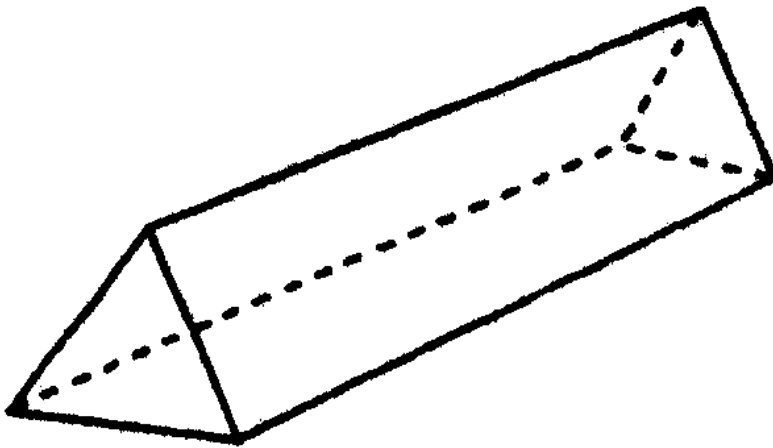
a) Match each form with the correct description:

		pyramid
		hexagonal prism

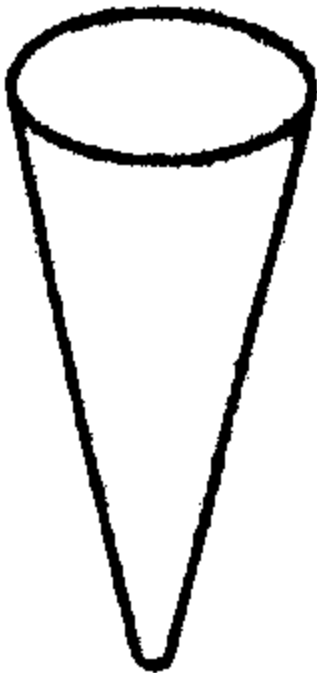


sphere

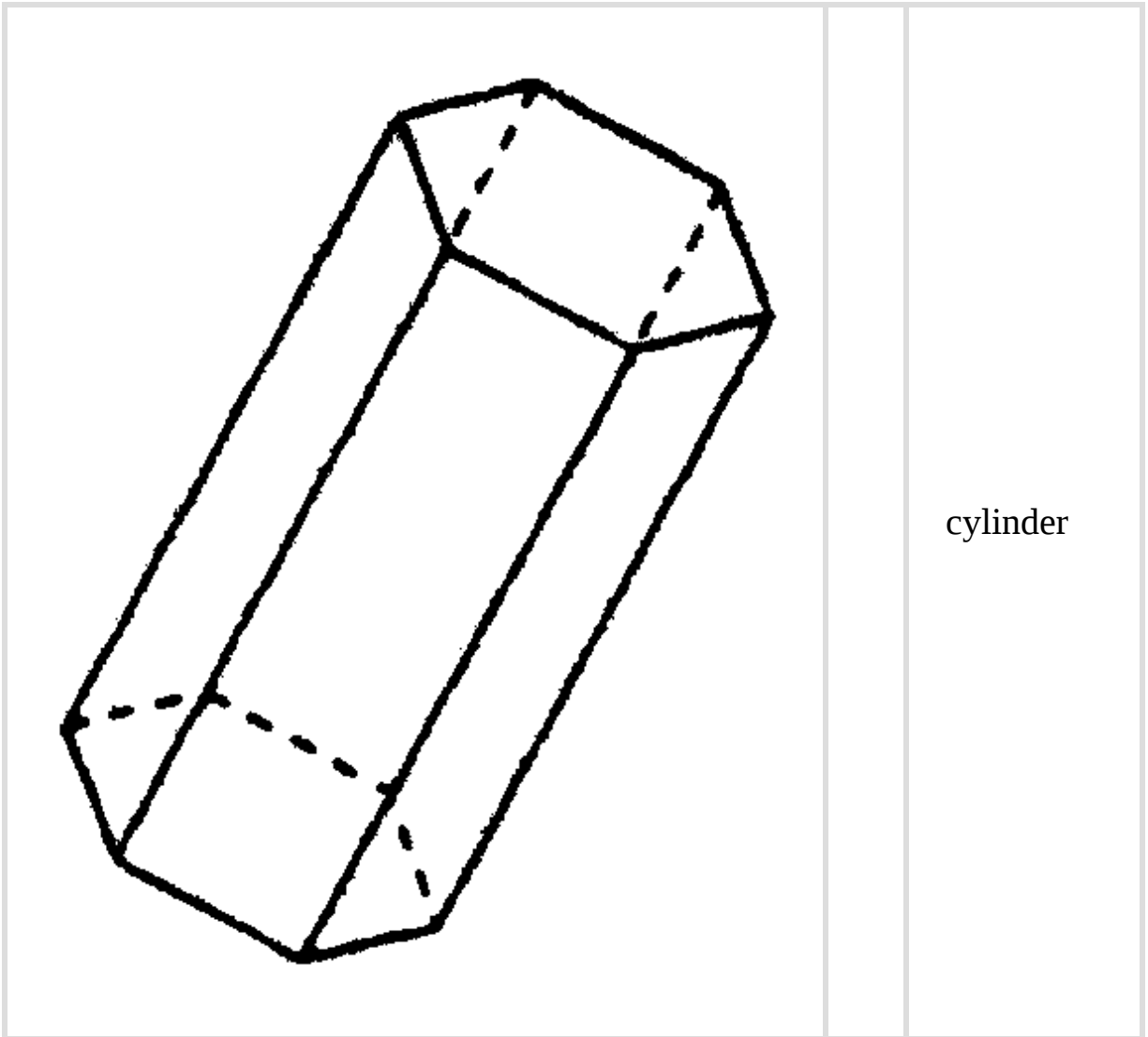
cone



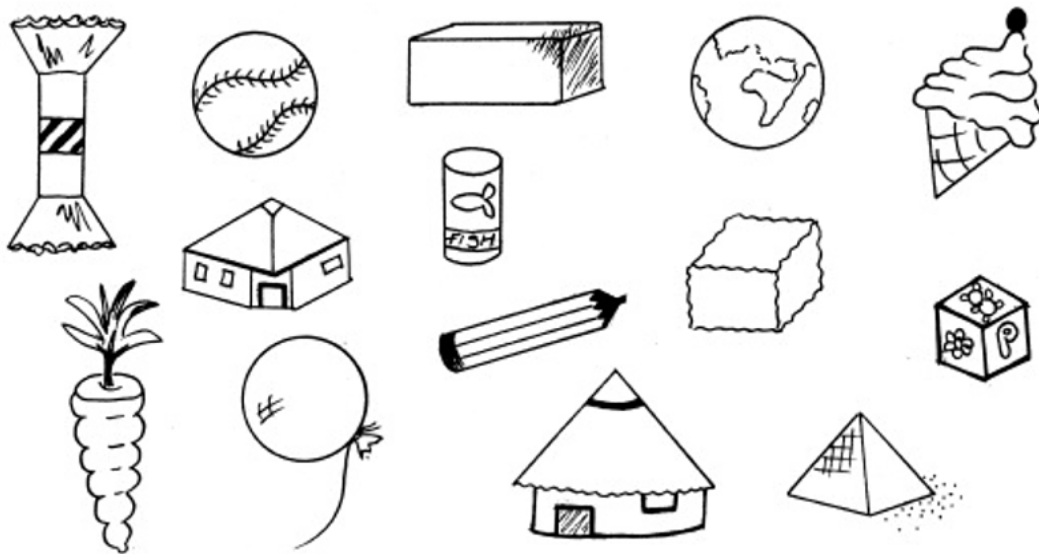
triangular  
prism



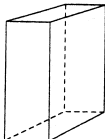
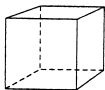

cube

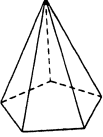
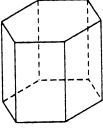
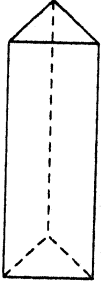


b) Now use the above information and group the following items. Then report back to the class, providing reasons why you have grouped the forms in this way.



c) Complete the following table:

	Figure	Vertex	Edge	Face
e.g.a)		8	12	6
b)		_____	_____	_____
c)		_____	_____	_____

d)		_____	_____	_____
e)		_____	_____	_____
f)		_____	_____	_____

d) Can you name all the figures above?

a)

\_\_\_\_\_

—

b)

\_\_\_\_\_

—

c)

\_\_\_\_\_

—

d)

\_\_\_\_\_

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e)

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f)

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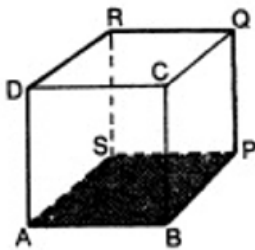
21. Let us take a closer look at three-dimensional objects.

21.1.1 Did you know?

A cube is a square shape. Thus all its edges are equally long.

21.1.2 Look at this cube.

Can you draw this cube from another angle?



## Assessment

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.1:** We know this when the learner recognises visualises and names geometric figures and solids in natural and cultural forms and geometric settings, including those previously dealt with;

***Assessment Standard 3.2:*** We know this when the learner in contexts that include those that may be used to build awareness of social, cultural and environmental issues, describes and classifies geometric figures and solids in terms of properties.



Nets

## **MATHEMATICS**

### **Perimeter, Area and Volume**

#### **EDUCATOR SECTION**

##### **Memorandum**

21.1.2

21.2.3

- 6; 8; 12
- 7

21.2.6

21.2.7

a) right-angled or rectangular prism

b) cuboid

a)

b)

#### **LEARNER SECTION**

##### **Content**

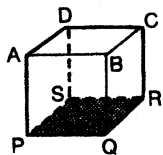
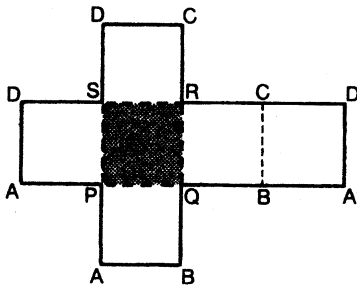
**ACTIVITY: Nets [LO 3.4, LO 3.7]**

## 21.2 NETS:

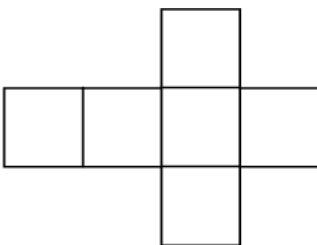
21.2.1 For this activity please bring a cardboard box of any size to school. Cut it open (be careful!) so that you can unfold it flat on your table or desk. Now count how many edges, vertexes and faces it has.

21.2.2 Did you know?

When we cut a cube or any other form open and lay it flat (see sketch) we call the spread-out cube/figure the net of the cube/figure. The dotted lines indicate the folds.



21.2.3 Look carefully at the following net of a cube. Can you draw one or two more nets that will differ from this one?



21.2.4 Now trace the net of the cube above neatly and accurately. Now fold your own cube. Use sticky tape to join the edges together

Complete: A cube has. \_\_\_\_\_ faces, \_\_\_\_\_ vertexes and \_\_\_\_\_ edges.

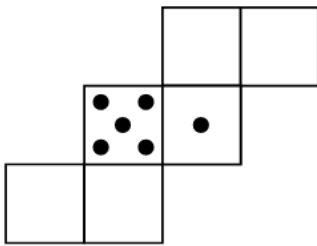
21.2.5 Now modify your cube into a di. Compare this with an actual di if you don't know where to make the dots!

What is the total number of dots on the opposite faces of a di?

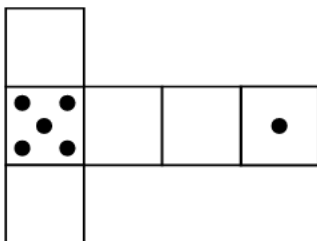
\_\_\_\_\_

21.2.6 Can you complete the following nets? Loosen the edges of your dice and fold it flat to help you.

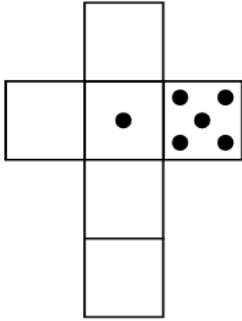
a)



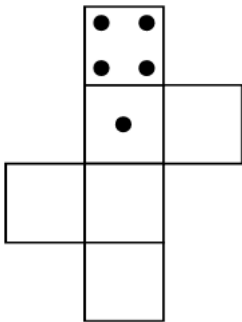
b)



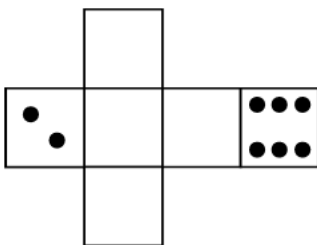
c)



d)



e)



21.2.7 Bring any empty cereal box from home to school. Cut it open along the edges and lay it flat. Now answer these questions:

a) What do we call this box you have brought along?

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b) Can you give a synonym for your answer at (a) ?

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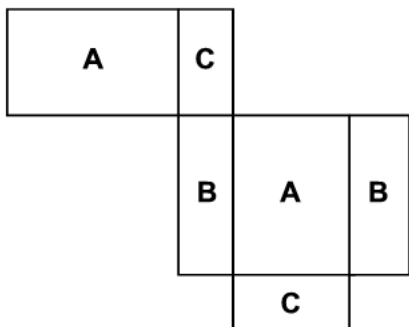
c) Now draw the net of the cereal box that you have cut open.

d) Can you also draw the net of a rectangular prism in another way?

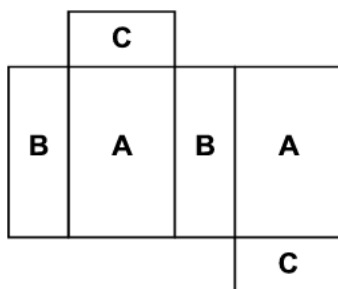
### 21.2.8 CLASS DISCUSSION

Which of the following nets, do you think, a manufacturer would rather use? Motivate!

A



B



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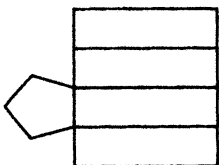
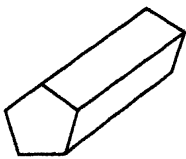
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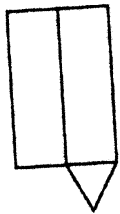
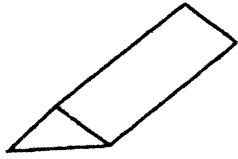
### 21.2.9 BRAINTEASER!

Two parts of the nets of the following figures are missing. Can you draw them in?

a)


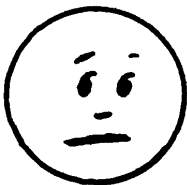




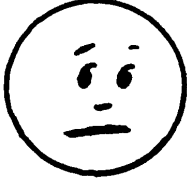


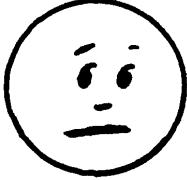


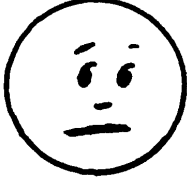


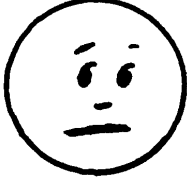


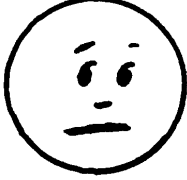

b)




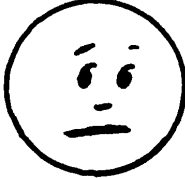


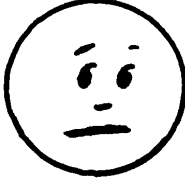


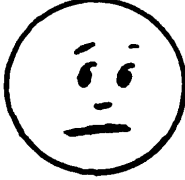


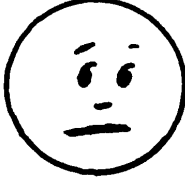


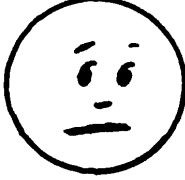

## 22. Time for self-assessment


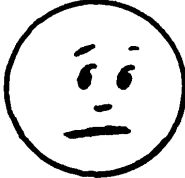


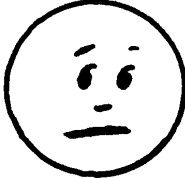


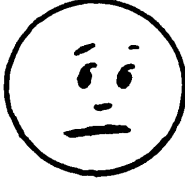

- Colour in the face that is true of your understanding of the work covered::

<ul style="list-style-type: none"><li>• Colour in the face that is true of your understanding of the work covered::</li></ul>			
I can explain the difference between 2 and 3 dimensional objects.			
I can explain the following concepts:			

• edge			
• vertex			
• face			
• cube			
• rectangular prism			
• layout			



			
I can identify and name different 3 dimensional forms.			
I can calculate the number of sides of a 3 dimensional figure.			
I can calculate the number of vertices of a 3 dimensional figure.			
I can calculate the number of sides of a 3 dimensional figure.			
I can draw a cube from different angles.			

			
I was able to complete the di layouts successfully.			
I can draw more than 1 layout of a rectangular prism.			

## Assessment

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.4:** We know this when the learner designs and uses nets to make models of geometric solids studied up to and including this grade;

**Assessment Standard 3.7:** We know this when the learner draws and interprets sketches of solids from different perspectives.

Volume

## **MATHEMATICS**

### **Perimeter, Area and Volume**

#### **EDUCATOR SECTION**

##### **Memorandum**

23.4

- a) 108 cubic cm
- b) 72 cubic cm
- c) 23,625 cubic cm
- d) 108 cubic cm

23.5

- a) 20 cubic cm
- b) 63 000 cubic mm
- c) 24 000 cubic cm
- d) 1 728 cubic cm
- e) own answer

#### **LEARNER SECTION**

##### **Content**

## **ACTIVITY: Volume [LO 4.2, LO 4.3]**

### 23. VOLUME

#### 23.1 Did you know?

The amount of space that is taken up by a solid body is called the volume of the body.

The internal volume is thus the space inside a hollow container. It is also called the capacity or contents of the container.

#### 23.2 IMPORTANT to REMEMBER!

Volume is measured in cubic measuring units

We use the following units:

cubic mm :  $\text{mm}^3$

cubic cm :  $\text{cm}^3$

cubic m :  $\text{m}^3$

1  $\text{cm}^3$  (cubic centimetre) is a cube with a length, breadth and height of 1 cm.

$$1 \text{ cm}^3 = 1 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm}$$

$$= 10 \text{ mm} \times 10 \text{ mm} \times 10 \text{ mm}$$

$$= 1\,000 \text{ mm}^3$$

$$1 \text{ m}^3 = 1 \text{ m} \times 1 \text{ m} \times 1 \text{ m}$$

$$= 100 \text{ cm} \times 100 \text{ cm} \times 100 \text{ cm}$$

$$= 1\,000\,000 \text{ cm}^3$$

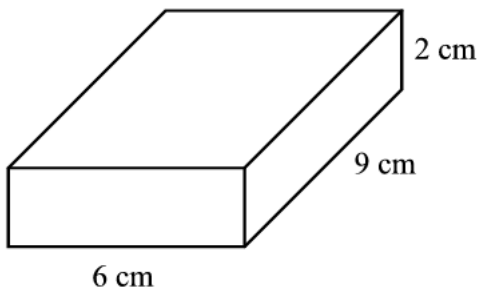
23.3 Also LEARN the following:

Volume of a rectangular prism is length x breadth x height

Volume of a cube is  $y^3$   $y$  = (length, breadth and height)

23.4 Use the formula: volume = length x breadth x height

to calculate the volume of the following figures:



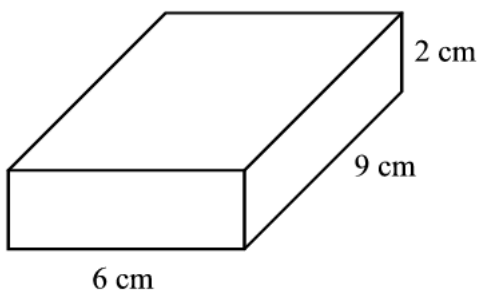
a)

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b)

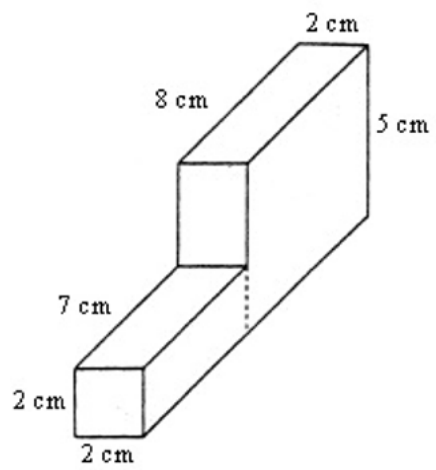
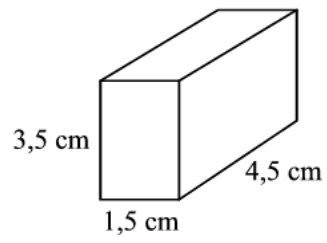


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c)



d)

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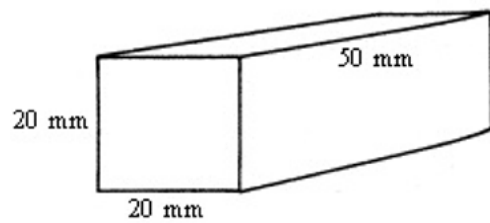
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23.5 a) Calculate the volume of the following in  $\text{cm}^3$ :



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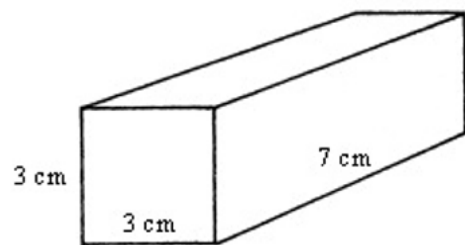
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b) Calculate the volume of the following in  $\text{mm}^3$



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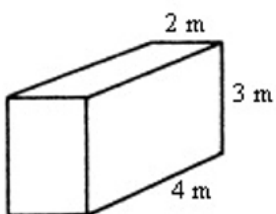
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c) What is the volume of the figure in  $\text{cm}^3$ ?



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d) Calculate the volume of a cube with a length of 12 cm.

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e) Estimate the volume of the box of chalk in your classroom

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## 23.6 CLASS DISCUSSION

How will you determine the volume of an irregular figure, e.g. a stone?

### 23.6.1 Did you know?

A Greek Mathematician, Archimedes, discovered how to calculate the volume of an irregular figure while he was bathing! He saw how water flowed over the edge of the bath when he climbed in. He realised that if he could measure the volume of water that his body displaced, then he could measure the volume of his own body. Archimedes was so excited by this realisation that he jumped out of the bath and ran down the street stark naked shouting, “EUREKA!” (I have found it!)

23.6.2 Follow the following steps and see if you can measure the volume of a stone that you have picked up outside.

a) Fill a cup completely to the top with water and put the cup in a bigger container. Remember to see precisely how many mL water you have in the cup!

b) Slowly lower the stone into the cup. Make certain that the water that overflows lands in the bigger container.

c) Measure the amount of water in the container by pouring it into a measuring cup.

d) Your stone has a volume of 1 cm<sup>3</sup> for each mL of water that overflowed because 1 mL = 1 cm<sup>3</sup>.

e) What is the volume of your stone?

\_\_\_\_\_

## **Assessment**

***Learning Outcome 4:*** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

***Assessment Standard 4.2:*** We know this when the learner solves problems;

***Assessment Standard 4.3:*** We know this when the learner solves problems using a range of strategies.

Volume and capacity

## **MATHEMATICS**

### **Perimeter, Area and Volume**

#### **EDUCATOR SECTION**

##### **Memorandum**

sugar / rice / sand fills up cube

1 000

1 000

24.3

a) 500

b) 200; 200

c) 30

d) 1 500; 1,500

e) 3 000

f) 0,950

147 litres

#### **MODULE TEST 8**

1.

a) 4

b) 30 000

c) 6

d) 2,5

e) 5

f) 2 000 000

g) 1

h) 1 000

2.

a) cube

b) pyramid

- 8
- 5

4.

5. 114 mm

6. 48,72 cubic cm

7. Braai room = 28,125 square metres

Tiles = 0,0625 square metres

Tiles needed: 45

8.

a) Tank holds 38,985 cubic metres = 38 985 000 cubic cm

Therefore: 38 985 litres

b) 38,985 kl

## **LEANER SECTION**

### **Content**

#### **ACTIVITY: Volume and capacity [LO 4.3, LO 4.5]**

#### **24. VOLUME AND CAPACITY**

24.1 Let us look at the two terms : volume and capacity :

##### **VOLUME**

How much space something occupies. Is measured in cubic units:  $\text{m}^3$ ;  $\text{cm}^3$ ;  $\text{mm}^3$

##### **CAPACITY**

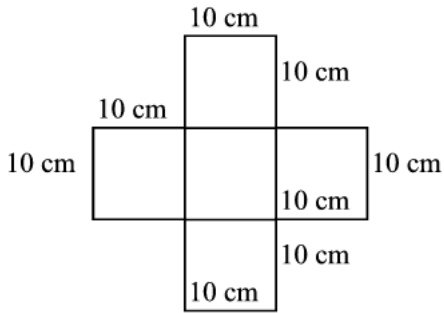
Normally refers to liquids. Normally measured in kl, litre or ml

##### **24.2 NOTE:**

You know already that  $1 \text{ cm}^3 = 1 \text{ ml}$

Let us see how many  $\text{cm}^3$  are in 1 l

- Draw the following net on cardboard. (Be accurate.)



§ Now cut it out and fold along all the dotted lines..

§ If you have worked correctly, you will have a cube of 1 000 cm<sup>3</sup>.

§ Now take any 1 ℓ bottle or measuring cylinder and fill it with sugar, rice or sand. Empty it into your cube. What do you see?

- Complete: 1 litre = \_\_\_\_\_ ml

= \_\_\_\_\_ cm<sup>3</sup>

24.3 Fill in the missing answers

a) 500 ml = \_\_\_\_\_ cm<sup>3</sup>

b) \_\_\_\_\_ ml = 0,200 litre = \_\_\_\_\_ cm<sup>3</sup>

c) 30 ml = \_\_\_\_\_ cm<sup>3</sup>

d) \_\_\_\_\_ ml = 1 500 cm<sup>3</sup> = \_\_\_\_\_ litre

e) 3 litre = \_\_\_\_\_ cm<sup>3</sup>

f) \_\_\_\_\_ litre = 950 cm<sup>3</sup>

24.4 The inside measurements of a bath are 60 cm by 140 cm. by 35 cm.

How many litres of water does the bath take when it is half-full?

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## 25. Time for self-assessment

• Tick the applicable column:	Yes	No
I can explain the following concepts:		
• Capacity		
• volume		
I know what units volume is measured in.		
I can convert $\text{cm}^3$ to $\text{mm}^3$ and vice versa.		
I can convert $\text{m}^3$ to $\text{cm}^3$ and vice versa.		
I know the formula for the volume of a		

• rectangular prism		
• cube		
I can calculate correctly the volume of figures.		
I know how to determine the volume of an irregular figure.		
I can convert mL to $\text{cm}^3$ and vice versa.		
I can convert $\ell$ to $\text{cm}^3$ and vice versa.		

## 26. CHALLENGE!

A sweet company asks you to design a container for a new type of sweet. Each sweet looks like an equilateral triangle that has sides 3 cm long. Each sweet is 1 cm thick.

- Design the container. Decide how many of these sweets will fit into your container.
- Design a label for the container that will attract the attention of potential customers!

## Assessment

**Learning Outcome 4:** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

**Assessment Standard 4.3:** We know this when the learner solves problems using a range of strategies;



**Assessment Standard 4.5:** We know this when the learner calculates, by selecting and using appropriate formulae.

## MODULE TEST

1. Fill in the missing answer:

a)  $400 \text{ mm}^2 = \underline{\hspace{2cm}} \text{ cm}^2$

b)  $3 \text{ m}^2 = \underline{\hspace{2cm}} \text{ cm}^2$

c)  $6\,000\,000 \text{ m}^2 = \underline{\hspace{2cm}} \text{ km}^2$

d)  $20\,500 \text{ m}^2 = \underline{\hspace{2cm}} \text{ ha}$

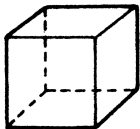
e)  $5\,000 \text{ mm}^3 = \underline{\hspace{2cm}} \text{ cm}^3$

f)  $2 \text{ m}^3 = \underline{\hspace{2cm}} \text{ cm}^3$

g)  $1 \text{ cm}^3 = \underline{\hspace{2cm}} \text{ ml}$

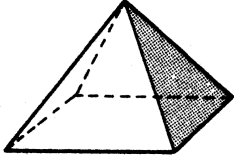
h)  $1 \text{ litre} = \underline{\hspace{2cm}} \text{ cm}^3$  ( $8 \times 1 = 8$ )

2. What do we call the following figures?



a)

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b)

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(2)

3.1 How many vertexes does figure A have?

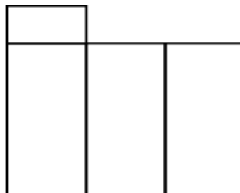
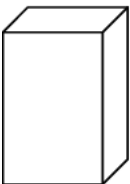
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3.2 How many faces does figure B have?

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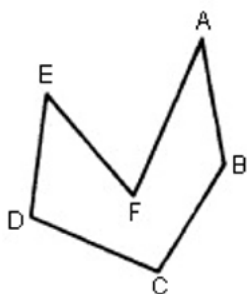
(2)

4. Two sections of the net are missing. Draw them in.



(2)

5. Calculate the perimeter of the following figure:



(3)

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(3)

6. Calculate the area of a rectangle in  $\text{cm}^2$ . Its length is 87 mm and breadth is 56 mm.

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(3)

7. My entertainment area is 6,25 m by 4,5 m. I want to tile the floor with tiles of 250 mm by 250 mm. How many tiles do I need?

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(5)

8. The inside measurements of a rectangular fish tank are 3 m by 2,3 m by 5,65 m.

a) What is the capacity, in litres, of the fish tank?

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(4)

b) What is its capacity in kilolitres?

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(1)

Revising

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

## **EDUCATOR SECTION**

### **Memorandum**

1.

(b)

(c)

(d) pentagon; hexagon

(e)

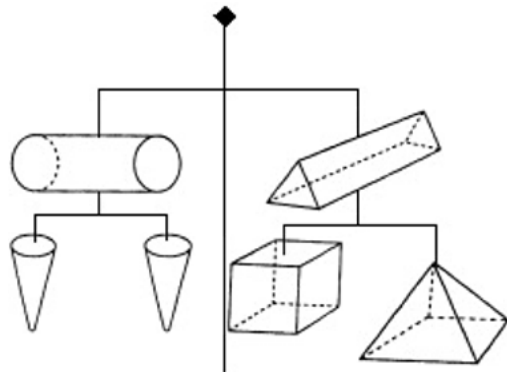
2. levelling instrument; plummet

## **LEARNER SECTION**

### **Content**

#### **ACTIVITY: Revising [LO 3.5, LO 4.4]**

1. Let us revise!

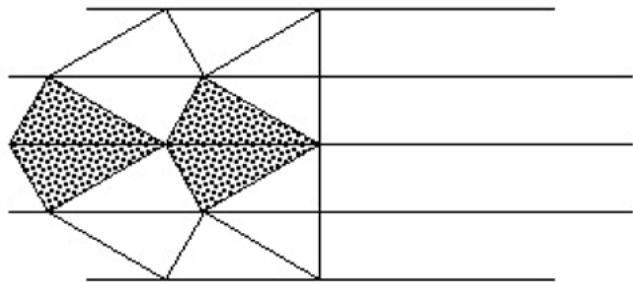
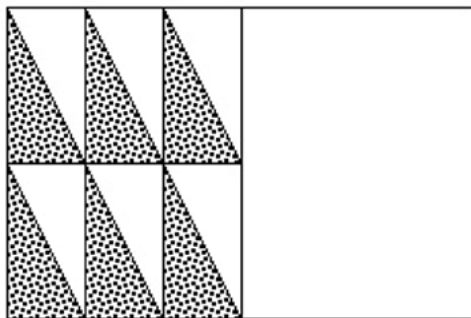


a) Form groups of three. Bring as many as possible empty 3-dimensional objects from home. Now make a Maths mobile that you can hang up in class. (Remember: it must balance!)

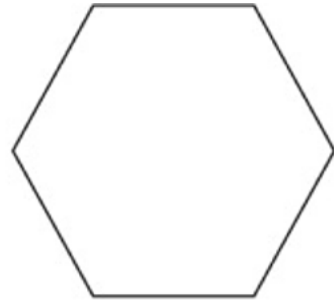
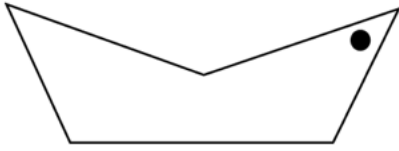
b) Complete the following so that the face will be symmetrical.



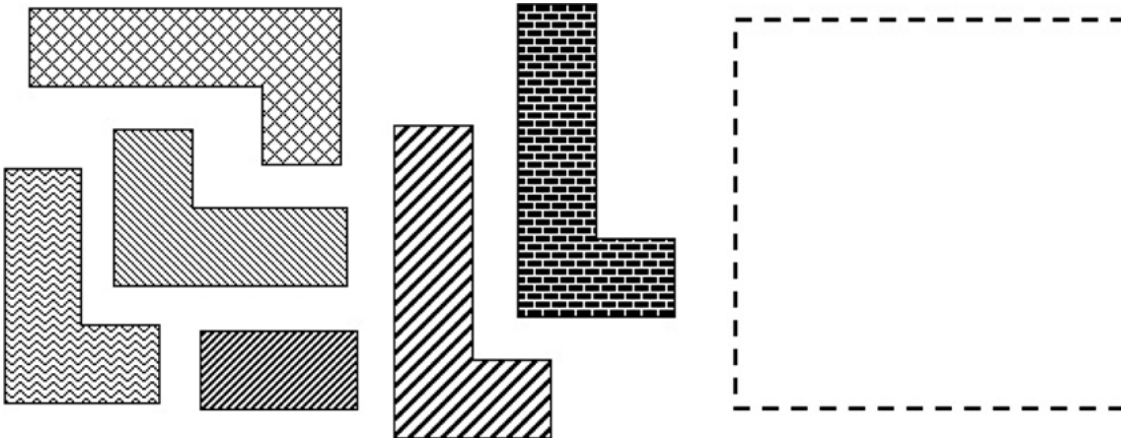
c) Keep to the pattern and complete the following tessellations.



d) What do we call the following two-dimensional figures?



e) Trace the shapes below. Cut them out and build a square. Paste them in the block below.



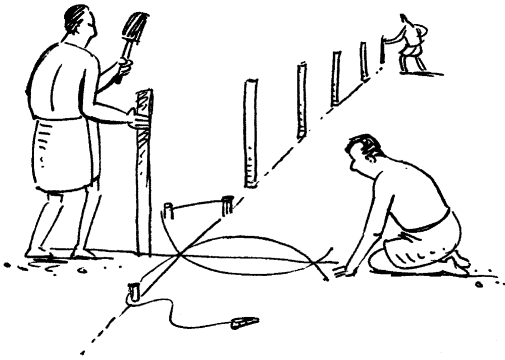
2. Did you know?

More than 2 500 years ago, the Egyptians of North Africa were measuring lengths. They realised that buildings, (the pyramids), had the same form but



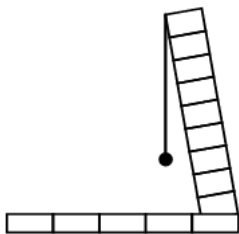
could have different sizes. To make sure their lines were straight, they stretched rope or wire between two pegs that had been planted in the ground. To measure the length of the base of the pyramid they made knots in the rope, equally far apart from each other. The main unit that they used for length was the “elbow-measure”. This was the length of the Pharaoh’s forearm – from his elbow to the tip of his middle finger.

- Imagine. You are the pharaoh. Measure the breadth of your classroom in “el” .....



To make sure that the walls were straight, they used a rope with a weight at the end of it. This was hung from the top – most point of the wall and the weight could swing freely. When it stopped swinging they could see if the wall was straight or not.

- What instrument do we use nowadays to make certain that walls are straight?



## **Assessment**

***Learning Outcome 3:*** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

***Assessment Standard 3.5:*** We know this when the learner uses transformations (rotations, reflections and translations) and symmetry to investigate (alone and/or as a member of a group or team) properties of geometric figures;

***Learning Outcome 4:*** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

***Assessment Standard 4.4:*** We know this when the learner describes and illustrates ways of measuring in different cultures throughout history, including metric and other formal measuring systems.

Compare sizes

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

#### **EDUCATOR SECTION**

##### **Memorandum**

3 cm	2 cm	10 cm	6 cm
6 cm	4 cm	20 cm	24 cm
9 cm	6 cm	30 cm	54 cm
15 cm	10 cm	50 cm	150 cm

3. (a)

(b) 2 twice more; 3 times more;

5 times more than first rectangle

(c) 16 times

4.2.1 – 4.2.4 Check learner's effort.

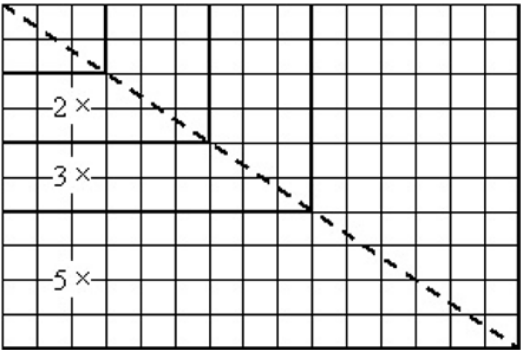
#### **LEARNER SECTION**

##### **Content**

**ACTIVITY: Compare sizes [LO 4.2, LO 3.8]**

3. LET US COMPARE SIZES!

The following rectangle has been enlarged first two times, then three times and then five times.



All the rectangles have the same ratio for length to breadth: 3:2.

a) Look again at the rectangles above. Suppose that each block is 1 cm by 1 cm. Complete the table.

Rectangle	Length	Breadth	Perimeter	Area
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____

b) What happens to the perimeter each time the rectangle is enlarged?

c) How many times larger is the area if the rectangle is enlarged four times?

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4.1 Did you know?

The ratio to scale is always written in a specific way:

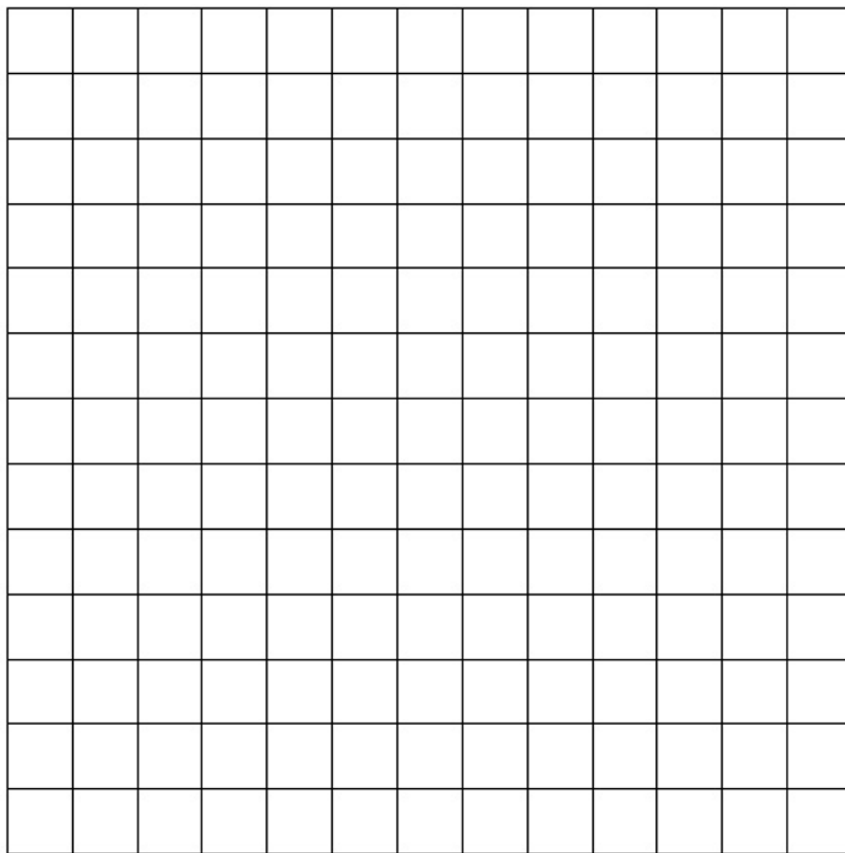
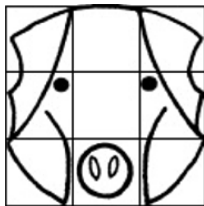
The first number refers to the drawing/plan.

The second number refers to reality.

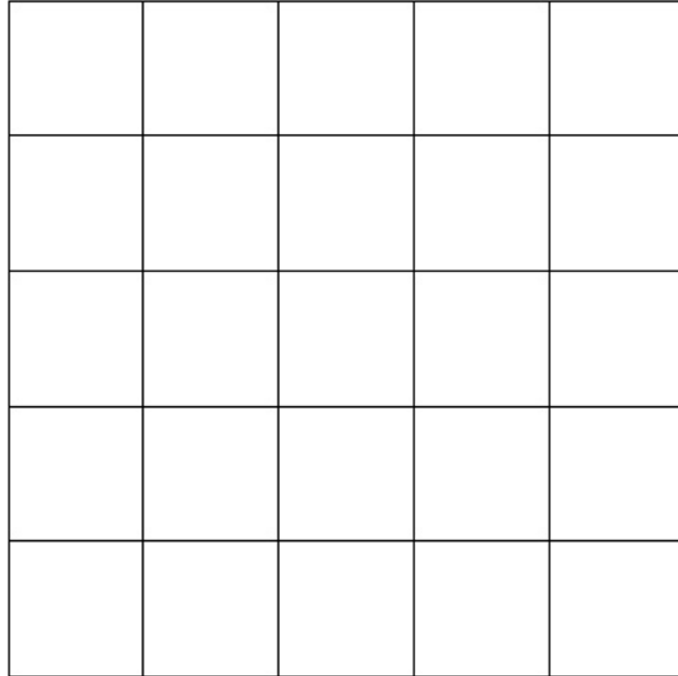
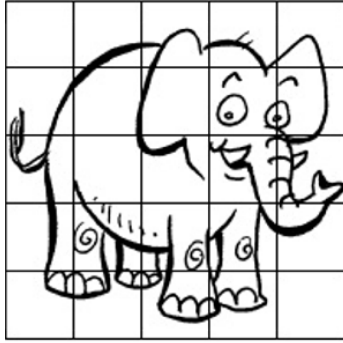
A scale of 1:5 means that the length is 5 times smaller than in reality.

A scale of 5:1 means that the length is 5 times bigger than in reality.

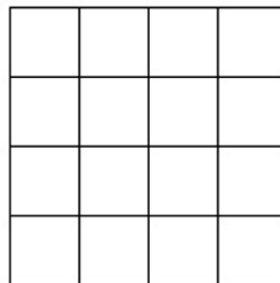
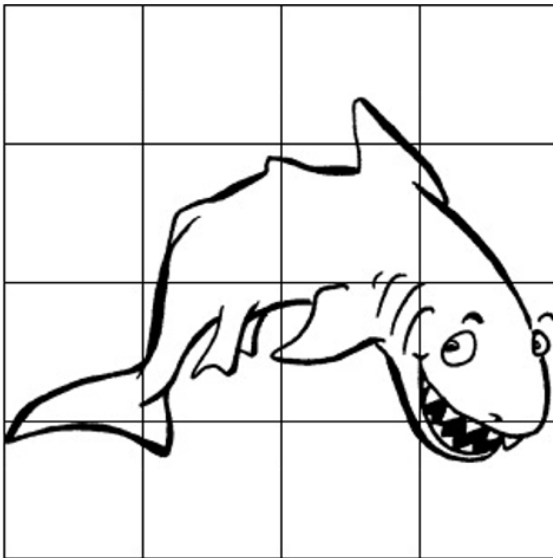
4.2.1 Use the graph paper and enlarge the sketch on a scale of 4:1.



4.2.2 Enlarge this drawing on a scale of 1:2.

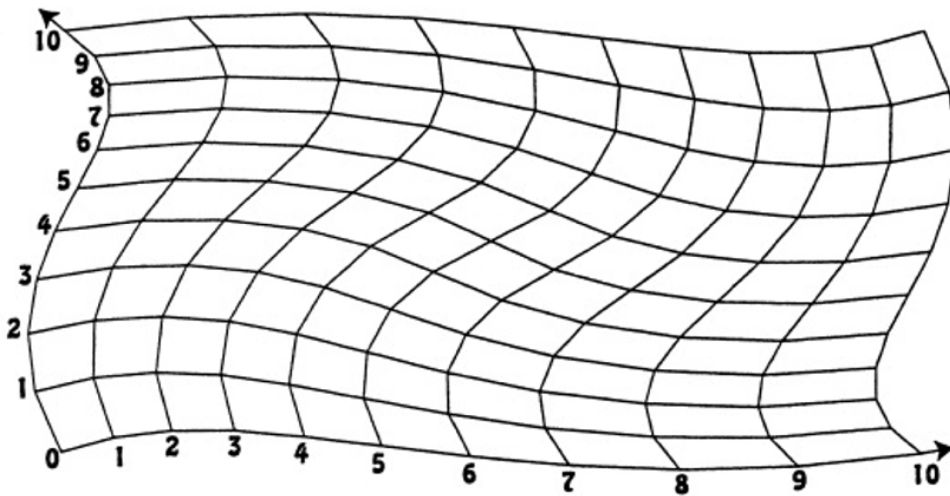
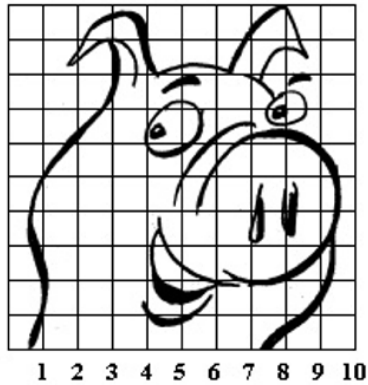


4.2.3 Reduce this sketch on a scale of 2:1.



4.2.4 BRAINTEASER!

- Can you enlarge this drawing and re-draw it?



## Assessment

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.8:** We know this when the learner locates positions on co-ordinate systems (ordered grids) and maps

**Learning Outcome 4:** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

**Assessment Standard 4.2:** We know this when the learner solves problems.

Symmetry and rotation

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

#### **EDUCATOR SECTION**

##### **Memorandum**

5.

(a) symmetry line; symmetry axle

(b) 90 degrees

4

(c) (i) 6

(ii) 3

(iii) 2

#### **LEARNER SECTION**

##### **Content**

##### **ACTIVITY: Symmetry and rotation**

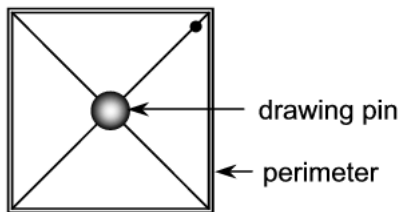
##### **5. SYMMETRY AND ROTATION**

a) Refer back to the drawing at 1 b). What do we call the dotted line?



---

b) Trace the following square and cut it out. Find the middle point by drawing in the diagonals. Attach your square to a piece of cardboard with a drawing pin. Make a dot in one corner of the square. Now draw the perimeter of the square on the cardboard using your pencil and a ruler.



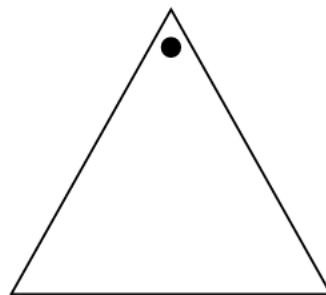
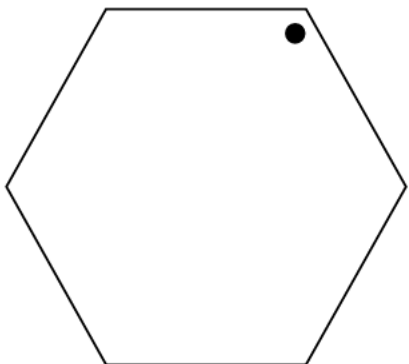
- Rotate the dot clockwise (turn it right) to the following corner.

How many degrees has the square rotated?

---

If you rotate the square 360 degrees, how many times have you turned it?

c) Do the same with the hexagon and triangle below.



i) How many times will the hexagon rotate in a full revolution?

---

ii) How many times does the triangle rotate in a full revolution?

---

---

iii) How many times does a rectangle rotate in a full revolution?

---

---

Transformations

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

#### **EDUCATOR SECTION**

##### **Memorandum**

8.

(a) 14

(b) 37

(c) 47

(d) 97

(e) 0,47

(f) 0,47

(g) 10 000

(h) 144

(i) 63

(j) 630

(k) 6 300

(l) 630 000

(m) 3

(n) 30

(o) 30

## LEANER SECTION

### Content

#### ACTIVITY: Transformations [LO 3.5, LO 1.8]

##### 6. TRANSFORMATIONS

6.1 Refer back to your tessellations at question 1(c). You could have completed the tessellations with a single triangle but then the triangle would have had to slide, turn or turn around.

##### 6.2 NOTE

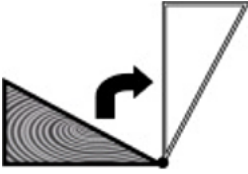
To move from the black tot the white triangle, we use the following transformations



Slide translation



Flip reflection



Rotation turn

6.3 Work together with a friend. Trace one of the triangles at question 1(c). Cut it out and match it up with your tessellations. See where you can slide, turn or turn the triangle around to complete the whole tessellation.

- Discuss your findings with the rest of the class.

6.4 Draw any tessellation where you can make use of any of the three transformations. Explain your tessellation to the rest of the class.

7. Time for self-assessment

• Tick the applicable block:	Yes	No
I was able to help build a 3-dimensional mobile that balanced.		
My face in 1(b) is symmetrical.		
I was able to complete correctly the tessellations at 1(c).		
I was able to determine correctly the breadth of the class in “el”.		

I can enlarge correctly sketches according to scale.		
I can reduce correctly sketches according to scale.		
I can explain the following concepts:		
• rotation;		
• transformation.		
I can determine how many times a given figure will rotate in a full revolution.		
I can draw tessellations by means of transformations.		

8. Complete the following mental test as quickly and accurately as possible:

a)  $8 + 6 =$  \_\_\_\_\_

b)  $28 + 9 =$  \_\_\_\_\_

c)  $28 + 19 =$  \_\_\_\_\_

d)  $58 + 39 =$  \_\_\_\_\_

e)  $0,97 - 0,5 =$  \_\_\_\_\_

f)  $1,97 - 1,5 =$  \_\_\_\_\_

g)  $105 \div 10 =$  \_\_\_\_\_

h)  $32 \times 42 =$  \_\_\_\_\_

i)  $7 \times 9 =$  \_\_\_\_\_

j)  $70 \times 9 =$  \_\_\_\_\_

k)  $70 \times 90 =$  \_\_\_\_\_

l)  $700 \times 900 =$  \_\_\_\_\_

m)  $18 \div 6 =$  \_\_\_\_\_

n)  $1\,800 \div 60 =$  \_\_\_\_\_

o)  $18\,000 \div 600 =$  \_\_\_\_\_

## Assessment

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.5:** We know this when the learner uses transformations (rotations, reflections and translations) and symmetry to investigate (alone and/or as a member of a group or team) properties of geometric figures;

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.8:** We know this when the learner performs mental calculations involving squares of natural numbers to at least  $10^2$  and cubes of natural numbers to at least  $5^3$ .

Data and statistics

## MATHEMATICS

### More Geometry, Data Handling and Probability

#### EDUCATOR SECTION

##### Memorandum

10.2.2 (a) 60

(c) 17

33

16

5

24

10.2.6

			4
	III		4
–	III	III	8
	III		4
–	III	I	6
	II		2

#### LEARNER SECTION

##### Content

**ACTIVITY: Data and statistics [LO 5.7, LO 5.9, LO 5.5]**

#### 9 DATA AND STATISTICS

##### 9.1 Class discussion

- Precisely what are “data” and “statistics”?
- When do we use these terms?
- Where do we get the information?



- How can we represent the information that is obtained?

## 9.2 Something more to discuss

- Divide into groups of three. How would you answer the following questions?

- What is the average height of a Grade 7 boy in South Africa?
- Which TV programme do Grade 7 girls in South Africa watch the most?
- What is the most popular brand of chips in South Africa?
- How many learners play tennis in the Western Cape?
- What is the average mass of the Grade 7 educators in your school?
- What is the average age of the Grade 7 learners in your school?

## 10. COUNTING AND GROUPING OF DATA

### 10.1.1 Did you know?

Sometimes it is very difficult to get information from the whole group that you had to interview (see 9.2(c) above). That is why often only a part of the group is questioned. This is seen as a sample of the bigger group.

If you do a sample of the larger group, it must be representative of the larger group, i.e.:

- You must ask enough people.
- You must ask a large variety of people. (age, sex, etc.)

### 10.1.2 Class discussion:

- Which of you and how many will allow yourselves to be questioned as part of a sample to find out the following? Remember: you will want realistic answers!

- What is the favourite sport of the girls in your school?
- What is the favourite magazine of English-speaking South Africans?
- What is the most common illness/ailment that people over 50 years old in South Africa suffer from?

### 10.2.1 Study the following data that was collected during a sample. It indicates the ages of secretaries.

32	24	25	18	23	25	26	19	33	30	21	24
23	23	26	25	22	21	24	18	18	22	20	18
19	32	30	22	21	20	20	20	22	23	21	24
26	28	29	24	23	21	18	24	23	27	26	29
24	19	20	25	29	26	24	18	28	17	25	22

10.2.2 Answer the following questions:

a) How many secretaries were questioned in the sample?

b) Work together with a friend. How can you organise/group this information so that it makes sense? Report back to the class!

c) Complete:

- The youngest secretary is \_\_\_\_\_ years old.
- The oldest secretary is \_\_\_\_\_ years old.
- The difference between the oldest and the youngest secretaries is \_\_\_\_\_ years.
- \_\_\_\_\_ secretaries are 21 years old.
- The largest number of secretaries that were the same age, were all \_\_\_\_\_ years old.

10.2.3 Did you know?

One way of organising information is by means of the “stem” and “leaf” diagram.

Stem	Leaf
(tens)	(units)
3	2 ; 3; 0 ; etc.
1	8 ; 9 ; 8 ; 8 ; etc.

The first row is thus 32, 33, 30 etc.

10.2.4 Find out the mass of 15 of your classmates. Represent the data by means of a stem and leaf diagram.

10.2.5 Did you also know?

You can also count the data by drawing lines/sticks and then drawing up a tally. Every fifth line/stick crosses out the previous. The numbers will look like this:

one: I

two: II

three: III

four: IIII

five: IIII

10.2.3 Use the information below to complete the table. The information shows how many marks out of 30 the Grade 7 girls achieved:

24	28	26	24	24	26	22	20	24	26	28	28	24	18	20
22	22	24	20	20	26	28	30	28	30	28	24	24	22	16

Marks	Lines	Total
16	I	1
18	I	1
20	III	_____
22	_____	_____
24	_____	_____
26	_____	_____
28	_____	_____
30	_____	_____

## Assessment

**Learning Outcome 5:** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

**Assessment Standard 5.7:** We know this when the learner identifies the largest and smallest scores in a data set and determines the difference between them in order to determine the spread of the data (range);

**Assessment Standard 5.9:** We know this when the learner critically reads and interprets data presented in a variety of ways to draw conclusions and make predictions sensitive;

**Assessment Standard 5.5:** We know this when the learner organises (including grouping where appropriate) and records data using tallies, tables and stem-and-leaf displays.

Modes, medians and arithmetic mean

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

#### **EDUCATOR SECTION**

##### **Memorandum**

#### **LEARNER SECTION**

##### **Content**

**ACTIVITY: Modes, medians and arithmetic mean [LO 5.6, LO 5.9]**

#### **11. MODES, MEDIANS AND ARITHMETIC MEAN**

##### **11.1 LEARN the following CONCEPTS**

###### **MODE :**

The value that is repeated the most often

E.g. 5; 6 ;6 ;7; 4 ; 8 ; 6 ; 6

The mode is 6.

Sometimes there is more than one mode:

E.g. 2; 3 ; 3 ; 4 ; 6; 2 ; 5

The modes are 2 and 3.

###### **MEDIAN :**

This is the value that lies in the middle when data is arranged from smallest to biggest.

E.g. 18 ; 21 ; 22 ; 23 ; 27 ; 31 ; 40

If there is an even number of values, then the median is the average of the two centre values.

E.g. 4 ; 5 ; 6 ; 6 ; 6 ; 7 ; 7 ; 9 ; 9 ; 10

The median =  $(7 + 6) \div 2 = 6,5$

ARITHMETIC MEAN (AVERAGE):

Add all the values together and divide by the number of the values.

E.g. 2; 3; 5; 5; 6

=  $21 \div 5$

= 4,2

11.2 Here follows a list of the shoe sizes of ten Grade 7 boys:

6 ; 7 ; 9 ; 8 ; 8 ; 9 ; 5 ; 6 ; 7 ; 8

a) Calculate the mode:

---

b) Calculate the median:

---

c) If the shoe sizes were a mark out of 10, what would the arithmetic average of the “test” be?

11.3 Calculate the average age (in years) of your class.

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11.4 Choose 10 of your classmates and determine the average number of children per family.

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## Assessment

**Learning Outcome 5:** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

**Assessment Standard 5.6:** We know this when the learner identifies the largest and smallest scores in a data set and determines the difference

between them in order to determine the spread of the data (range);

***Assessment Standard 5.9:*** We know this when the learner summarises ungrouped numerical data by determining mean, median and mode as measures of central tendency and distinguishes between them.

Methods to gather information

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

#### **EDUCATOR SECTION**

##### **Memorandum**

12.2

(a) 8

(b) 7,5 (7 and a half)

(c) 7,3

12.5 Internet

#### **LEARNER SECTION**

##### **Content**

**ACTIVITY: Methods to gather information [LO 5.1, LO 5.2, LO 5.3, LO 5.6, LO 5.9]**

#### **12. METHODS TO GATHER INFORMATION**

##### **12.1 Yes / No Answers**

a) Interview any member of your family and tick the applicable block:



	Yes	No
Do you readily eat cabbage?		
Do you like sport?		
Do you watch TV longer than 2 hours per day?		
Do you take any medication?		
Do you suffer from asthma?		
Do you like pizza?		
Do you own a car?		
Do you have brothers and/or sisters?		
Are you the oldest child?		
Do you work full-time?		
Do you have high blood-pressure?		
Do you think the petrol price will increase?		
Do you think the interest rate will be increased this year?		

b) Where, do you think, are questionnaires like this one regularly used?

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## 12.2 Variety of answers

12.2.1 Now interview another family member and write down his/her answers:

a) What is your occupation?

---

b) How many children do you have?

---

c) What is your favourite TV program?

---

d) What book have you read recently?

---

e) What kind of car do you drive?

---

f) What kind of music do you like to listen to?

---

g) What is the greatest crisis in our country, do you think?

---

---

---

h) What, according to you, must our government give immediate attention to?

---

---

---

---

i) Why is the Rand so unsteady?

---

---

—

j) Why do food prices keep on rising?

---

---

—

12.2.2 Divide into groups of three and compare your answers.

12.2.3 Where would questionnaires that have a variety of possible answers, normally be used?

---

—

---

—

### 12.3 Given information

- Sometimes you get the answers you are looking for from given information.

a) Cut out an advertisement from the newspaper that advertises the most expensive house. Stick it in the block below.

b) Consult your advertisement and complete the following:

i) Price of the house:

---

ii) Suburb/Town/City:

---

iii) Number of bedrooms:

---

iv) Number of bathrooms:

---

v) Number of garages:

---

vi) Other rooms mentioned:

---

---

vii) Any “extras” (e.g. swimming pool):

---

---

---

viii) Would you buy the house if you could afford it?

---

Why?/Why not?

---

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---

c) Make a list of the prices of 10 more houses that have been advertised:

---

---

---

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This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

i) Calculate the median.

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---

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ii) What is the average price at which the houses are being advertised?

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12.4 Collect the following information:

a) Consult your local newspaper/TV guide. See how much time is spent on the following and complete the tables.

TV 2					
Programme	Mon	Tues	Wed	Thurs	Fri
News					
Soap Operas					
Movies					
Child Entertainment					
Sport					

TV 3					

Programme	Mon	Tues	Wed	Thurs	Fri
News					
Soap Operas					
Movies					
Child Entertainment					
Sport					

b) Answer the following questions:

i) The most time is spent on ..... on TV2 (Type of programme)?

\_\_\_\_\_

—

ii) The least time is spent on ..... on TV3 (Type of programme)?

\_\_\_\_\_

—

iii) Which channel spends the most time on sport?

\_\_\_\_\_

iv) Which channel spends the least time on child entertainment?

\_\_\_\_\_

v) Which type of programme mentioned above do YOU watch the most?

\_\_\_\_\_

—

12.5 Can you think of more methods of collecting information?

---

## Assessment

***Learning Outcome 5:*** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

***Assessment Standard 5.1:*** We know this when the learner poses questions relating to human rights, social, economic, environmental and political issues in own environment;

***Assessment Standard 5.2:*** We know this when the learner selects appropriate sources for the collection of data (including peers, family, newspapers, books, magazines);

***Assessment Standard 5.3:*** We know this when the learner uses simple questions (with a variety of possible responses) and designs and uses questionnaires (with yes/no type responses) in order to collect data (alone and/or as a member of a group or team) to answer questions;

***Assessment Standard 5.6:*** We know this when the learner identifies the largest and smallest scores in a data set and determines the difference between them in order to determine the spread of the data (range);

***Assessment Standard 5.9:*** We know this when the learner summarises ungrouped numerical data by determining mean, median and mode as measures of central tendency and distinguishes between them.



Ways in which to represent data

## MATHEMATICS

### More Geometry, Data Handling and Probability

#### EDUCATOR SECTION

##### Memorandum

#### LEARNER SECTION

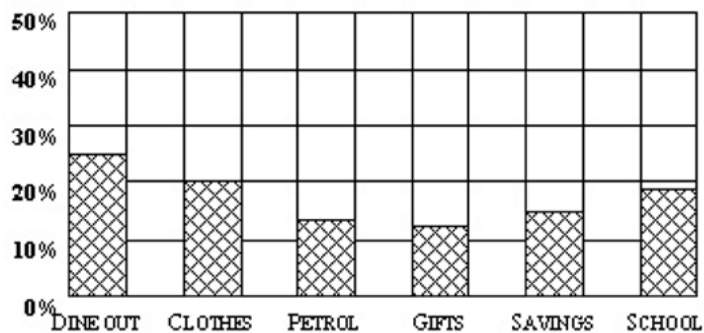
##### Content

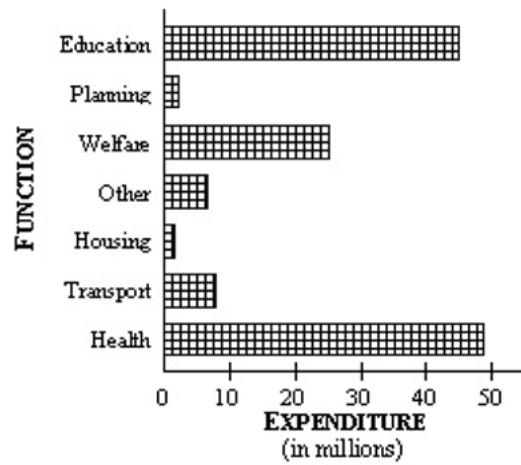
##### ACTIVITY: Ways in which to represent data [LO 2.6]

##### 13. WAYS IN WHICH TO REPRESENT DATA

13.1 There are different ways in which data can be represented. Work through the following examples with a friend and make sure you understand each one.





























##### COLUMN / BAR GRAPHS






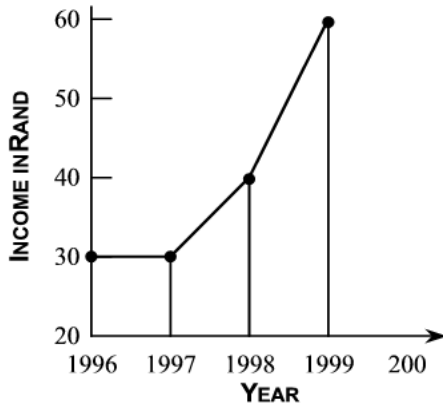
PIE GRAPH

PICTOGRAM

PICTOGRAM	
RUGBY	       
NETBALL	       
TENNIS	   
HOCKEY	 
SOCCER	     

 = 20

LINE GRAPHS



### 13.2 CHALLENGE!

Work in groups of three. Page through your local newspaper and magazines. Cut out as many representations of data as possible. Group them and stick them neatly on cardboard. Hold an exhibition and discuss each group with the rest of the class.

- Evaluate each presentation critically!

### 13.3 Time for self-assessment

• Tick the applicable column:	Uncertain	Certain
I can explain the concepts:		
• data/statistics		

<ul style="list-style-type: none"> <li>• sample</li> </ul>		
<ul style="list-style-type: none"> <li>• mode</li> </ul>		
<ul style="list-style-type: none"> <li>• median</li> </ul>		
<ul style="list-style-type: none"> <li>• arithmetic mean (Average)</li> </ul>		
I can name at least two methods to organise information.		
I can calculate the following correctly from given information:		
<ul style="list-style-type: none"> <li>• mode</li> </ul>		
<ul style="list-style-type: none"> <li>• median</li> </ul>		
<ul style="list-style-type: none"> <li>• arithmetic mean (Average)</li> </ul>		
I can name at least two methods to collect information.		
I can explain what the following is and what it looks like:		

• column/bar graph		
• line graph		
• pie graph		
• pictogram		
I was able to correctly collect the information at question 12.3.		
I was able to correctly collect the information at question 12.4.		

## Assessment

**Learning Outcome 2:** The learner will be able to recognise, describe and represent patterns and relationships, as well as to solve problems using algebraic language and skills.

**Assessment Standard 2.6:** We know this when the learner describes a situation by interpreting a graph of the situation, or draws a graph from a description of a situation (e.g. height of a roller-coaster car over time; the speed of a racing car going around a track).

Own representation of data

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

#### **EDUCATOR SECTION**

##### **Memorandum**

14.1 – 14.5 Check learner's efforts

14.4 Fanta

14.5 R25,00

15.1 (a) half past eight

(b) 1 hour 40 min

(c) 53 min

(d) half past six

(e) 55 min

(f) 18 hours

15.2 (a) 14 000 km

(b) 14,7 hours

(c) approximately 7 200 km

(d) 600 km/h

(e) approximately 49 and a half

(f) 12 hours 47 min

(g) 08:05

(h) 07:05

(i) “Daylight saving” –use as much sun as possible.

(j) USA

## **LEANER SECTION**

### **Content**

**ACTIVITY: Own representation of data [LO 5.5, LO 5.8, LO 5.9, LO 4.1]**

#### **14. OWN REPRESENTATION OF DATA:**

14.1 Vusi, a learner in Grade 7, was seriously sick and had to go to hospital. The nurse took his temperature regularly

08:00 37,8°

10:00 38,2°

12:00 38,4°

14:00 37,6°

16:00 38°

18:00 39,2°

20:00 38,8°

- Represent the information on a line graph.

14.2 In a certain town water is consumed as follows:

gardening 32%

laundry and dishes 15%

toilets 28%

bathing 20%

cooking and drinking 5%

- Represent the information by means of a pie graph

14.3 During the election of prefects at Sunshine Primary School, Stephanie received 80 votes, Tamara received 120 votes, Buck 60 votes and Sean 140 votes.

- Draw a pictogram to indicate the position of the votes.

14.4 Draw a column/bar graph to represent the sales of cool drink during the year:

Lemonade 22 000 litres

Fanta 38 000 litres

Coke 45 500 litres

Cream soda 20 500 litres

Tab 43 250 litres

- The sales of which cool drink are the closest to the average sales of all the cool drinks?

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14.5 BRAIN-TEASER!

- Can you show the following information on the same graph?

Jan Feb Mar Apr May

	Jan	Feb	Mar	Apr	May
Price of Cheddar cheese per kg	R12.50	R15.00	R12.50	R17.50	R22.50
Price of Sweet milk cheese per kg	R17.50	R22.50	R12.50	R20.00	R25.00

(Hint: draw up a double column graph!)

- Why, do you think, does the price vary from month to month?

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- How much more would you have paid for Sweet milk cheese in February than in January?

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## 15. INTERPRETATION OF DATA

15.1 Look at the TV guide and answer the following questions.

<b>M-NET</b>	
<b>Monday, 2 September</b>	
<b>06:00 Supersport</b>	Golf: The pitch and Putter
<b>07:15 World of Rugby</b>	
<b>07:45 Soccer:</b>	Western Union World Football
<b>08:15 Surfing</b>	
<b>08:30 Aerobic exercises</b>	
<b>09:00 Informercials</b>	
<b>10:00 CSI</b>	
<b>11:00 *What women want</b>	(Comedy, PG13 S, 2000) A charming flatterer who believes all women find him desirable, suddenly develops the ability to hear what women are thinking. With Mel Gibson and Helen Hunt.
<b>13:05 Informercials</b>	
<b>17:00 Maybe its me</b>	
<b>17:30 Married with children</b>	
<b>18:00 Egoli – place of gold</b>	
<b>18:30 Big Brother II</b>	
<b>19:02 Once and Again</b>	
<b>19:55 M-Net cares</b>	
<b>20:00 *Dancing in September</b>	(Drama, 13 VL 2000) A satire about the TV industry.
<b>22:05 Bellevue</b>	– inside out (Documentary): Treatment in a Psychiatric Emergency Unit
<b>23:15 Supersport timeout</b>	
<b>23:20 Braveheart</b>	(Action, 16 V, 1995)
<b>03:20 * Deep in my heart</b>	(Drama, 13 V, 1999): With Gloria Reuben and Anne Bancroft
<b>05:00 Tennis:</b>	American Open

a) At what time can you look at the aerobic exercises?

---

b) How long is the drama “Deep in my Heart”?

---

c) How long is the program “Once and Again”?

---

d) At what time can you watch Big Brother

II 

---

e) How long must you wait after “What women want” before you can watch KTV

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f) How long is the whole broadcast on this particular day?

---

g) How much time do YOU spend every day, on average, watching TV?

---

15.2 Study the world map and the given scale and determine:

[missing\_resource: graphics2.wmf]

a) What is the distance from Cape Town to New York?

---

b) If an aeroplane flies at 950 km/h, how long is it going to take for you to fly from Cape Town to New York?

---

c) How far is it from Perth to Los Angeles?

---

d) At what speed are you travelling if it takes you 12 hours to cover the distance at c?

---

---

e) If you could walk at a speed of 8 km/h from Tokyo to London, then about how many days will it take you to complete the distance?

---

f) If you leave Cape Town at 20:18 and arrive in London the following morning at 09:05 (S.A. time), how long does your journey last?

---

g) What time will it be in England (March to September)?

---

h) What time will it be in England (September to March)?

---

i) Why does England adapt her time in this way?

---

---

j) Where else in the world is time also adapted in this way?

---

## Assessment

**Learning Outcome 4:** The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.

**Assessment Standard 4.1:** We know this when the learner solves problems involving time, including relating time, distance and speed;

**Learning Outcome 5:** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

**Assessment Standard 5.5:** We know this when the learner organises (including grouping where appropriate) and records data using tallies, tables and stem-and-leaf displays;

**Assessment Standard 5.8:** We know this when the learner draws a variety of graphs by hand/technology to display and interpret data (grouped and ungrouped);

**Assessment Standard 5.9:** We know this when the learner critically reads and interprets data presented in a variety of ways to draw conclusions and make predictions sensitive.

Another type of data

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

#### **EDUCATOR SECTION**

##### **Memorandum**

16.2

16.3 (1,1) (1,2) (1,3) (1,4) (1,5) (2,5) (2,4) (2,3) (3,3) (3,4) (3,5) (3,6)

(3,7) (4,7) (5,7) (6,7) (6,6) (7,6) (8,6) (8,5) (8,4) (8,3) (8,2) (8,1)

(9,1) (9,2) (9,3) (9,4) (9,5) (9,6) (9,7) (9,8) (8,8) (7,8) (7,9) (8,9)

(9,9) (9,10)

17.2

(a) 50, 7N

(b) 10, 2S

(c) 30, 5S

(d) 70, 5N

(e) 4W, 1N

(f) 5W, 3S

(g) 3W, 6N

(h) 10, 2N

19.

(a) 343

(b) 200

(c) 270 000

(d) 1 600 000

(e) 100

(f) 164

(g) 83

(h) 0

(i) 90

(j) 150

(k) 30

(l) R148

(m) 13

(n) 81

(o) 28

## **LEANER SECTION**

### **Content**

**ACTIVITY: Another type of data [LO 3.8, LO 5.9, LO 1.8]**

## 16. ANOTHER TYPE OF DATA

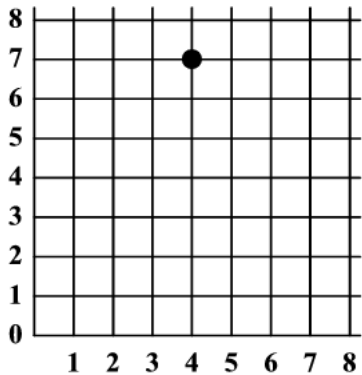
### 16.1 Did you know?

We can collect data or find information by plotting given co-ordinates on a grid.

Look carefully at the example.

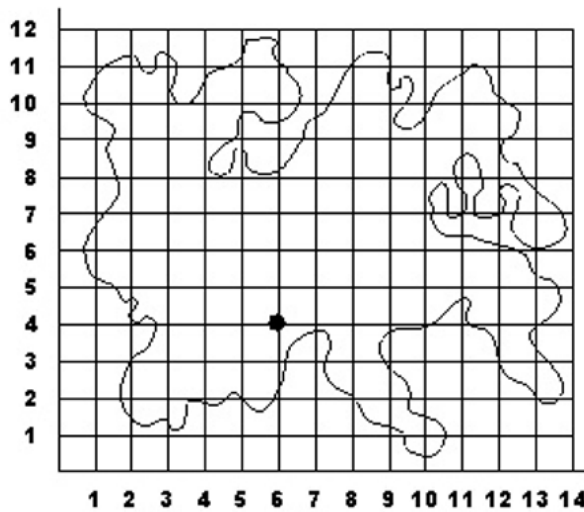
The dot (l) is at (4,7).





The 4 indicates the horizontal number and the 7 indicates the vertical number.



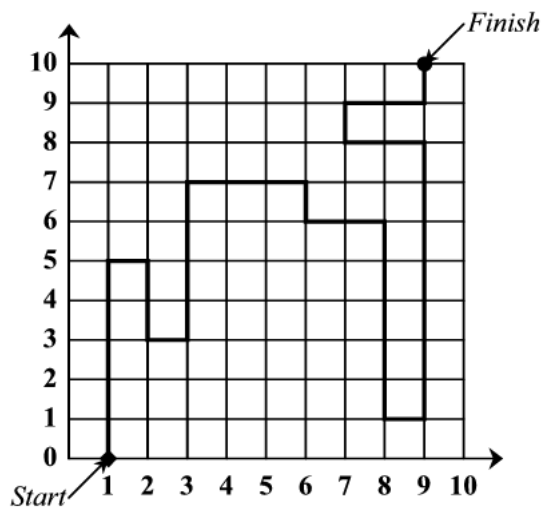
### 16.2 Plot the following on the island.





- a) A shipwreck at (12,2). Mark X
- b) A tree at (3,9). Mark 
- c) A river from (4,7) tot (12,5). Mark 
- d) Quicksand at (3,2) and (3,3). Mark 
- e) A lookout point at (11,10). Mark 
- f) Write down the co-ordinates of the treasure (marked●). (....., .....)

16.3 Write down the co-ordinates for the route that a group of learners followed during a recent fun-run.




---



---



---



---

[illegible]

## 16.4 CHALLENGE!

- Write your own secret message. Give the co-ordinates to a friend to decipher your message.



---

---

---

---

- Let your friend write your message here:

---

---

---

---

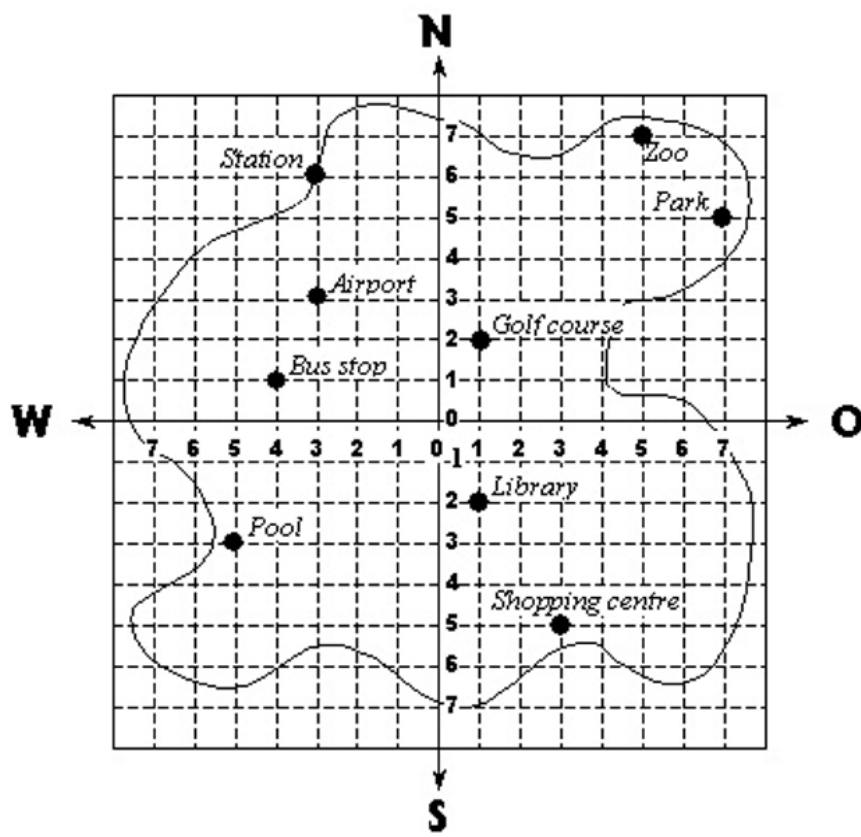
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---

17. Did you know?

17.1 Sometimes co-ordinates are combined with compass directions to find a certain place

You find the airport at 3W; 3N. (W = West; N = North)



17.2 Where will you find the following places?

a) Zoo

---

b) Library

---

c) Shopping centre

---

d) Park

---

e) Bus stop

---

f) Public swimming pool

---

g) Station

---

h) Golf course

---

18. Time for self-assessment

<ul style="list-style-type: none"><li>• Tick the applicable block:</li></ul>	Yes	<b>Still Struggling</b>
I was able to represent the information at 14.1 by means of a line graph.		
I was able to draw the pie graph at 14.2.		
I was able to correctly represent the number of votes in the election, in a pictogram.		
I was able to draw a column graph at 14.4.		
I was able to draw a double column graph at 14.5.		
I was able to correctly answer the questions at 15.1 in connection with time.		
I was able to interpret the given scale at 15.2 correctly and could answer the		

questions relating to it.		
I was able to interpret the given co-ordinates on the map correctly and could carry out the instructions at 16.2.		
I was able to correctly answer the questions referring to the combination of direction and co-ordinates (17.2).		

19. Let us see if you can get full marks for your last mental! Try to answer all the questions in less than 2 minutes!

a)  $7^3 =$  \_\_\_\_\_

b)  $5^2 \times 2^3 =$  \_\_\_\_\_

c)  $3^3 \times 10^4 =$  \_\_\_\_\_

d)  $2^4 \times 10^5 =$  \_\_\_\_\_

e)  $(4 \times 7) \div (8 \times 9) =$  \_\_\_\_\_

f)  $(12 \times 9) \div (7 \times 8) =$  \_\_\_\_\_

g)  $16 \div 6 \times 8 \div 19 =$  \_\_\_\_\_

h)  $(2 \times 8 \times 5 \times 4 \times 7) \times 0 =$  \_\_\_\_\_

i)  $=$  \_\_\_\_\_

j) of 200 = \_\_\_\_\_

k) 0,3 = \_\_\_\_\_ %

l) 25% of R592 = \_\_\_\_\_

m)  $(72 \div 9) \div (45 \div 9) =$  \_\_\_\_\_

n)  $(63 \div 7) \times (54 \div 6) =$  \_\_\_\_\_

o)  $92 - 9 \times 4 - 28 =$  \_\_\_\_\_

## Assessment

**Learning Outcome 1:** The learner will be able to recognise, describe and represent numbers and their relationships, and to count, estimate, calculate and check with competence and confidence in solving problems.

**Assessment Standard 1.8:** We know this when the learner performs mental calculations involving squares of natural numbers to at least  $10^2$  and cubes of natural numbers to at least  $5^3$ .

**Learning Outcome 3:** The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in a variety of orientations and positions.

**Assessment Standard 3.8:** We know this when the learner locates positions on co-ordinate systems (ordered grids) and maps.

**Learning Outcome 5:** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

**Assessment Standard 5.9:** We know this when the learner critically reads and interprets data presented in a variety of ways to draw conclusions and make predictions sensitive.



Probability

## **MATHEMATICS**

### **More Geometry, Data Handling and Probability**

#### **EDUCATOR SECTION**

##### **Memorandum**

20.3 (a) (i) a half (one out of 2)

(ii) a half (one out of 2)

(c) one quarter (one out of 4)

(d) 2 out of 21

20.4 (a) one sixth (one out of six)

20.5 six out of 36 (one sixth)

22. ALL THE MATHS IS DONE!

#### **MODULE TEST 9**

1. Check learner's effort.

2. glide

3. (a) Only a part of the group was questioned to get information

.

(b) About the possibility that something might happen.

4. (a) 10

(b) 10

(c) 10,6

5. (a) picture graph / pictogram

(b) Learners are six years and older in grade 1. / Nobody is younger than six years.

(c) 110

(d) 30

(e) 680

6.

7.4 4 out of 32 (one eighth).

## **LEARNERS SECTION**

### **Content**

### **ACTIVITY: Probability [LO 5.10, LO 5.9]**

#### **20. PROBABILITY**

##### **20.1 Class discussion**

- a) What chance do you have of passing Grade 7?
- b) What is the chance that it will rain today?
- c) What chance does your team (any sport) have of winning the next match?
- d) What is your chance of winning the Lotto?
- e) What is the chance that one day you will walk on the moon?

### 20.2.1 Did you know?

In the above cases, you have actually estimated the possibility that something will or will not happen.

### 20.2.2 Did you also know?

Probability stretches from “no chance” that something will happen to “it will definitely happen”.

A probability of 0 means that the happening will never occur.

A probability of 1 means that the happening will definitely occur.

### 20.2.3 IMPORTANT to KNOW:

The probability that something will happen depends on:

#### **The number of times it can happen**

Total number of possibilities

The closer you answer is to 1, the more likely it is that the event/happening will take place.

20.3 Work with a friend and answer the following questions:

a) You throw a coin up into the air. What is the probability that it will fall:

i) heads up? \_\_\_\_\_

ii) tails up? \_\_\_\_\_

b) Throw a coin into the air 50 times. Your friend can help you keep record which side of the coin faced upwards each time it landed.

i) Complete the table:

<div></div>	Heads	Tails	<div>Probability</div> <div>HeadsTails</div>	
E.g.	4	6	$\frac{4}{10}$	$\frac{6}{10}$
First 10 throws:	.....	.....	.....	.....
Second 10 throws:	.....	.....	.....	.....
Third 10 throws:	.....	.....	.....	.....
Fourth 10 throws:	.....	.....	.....	.....
Fifth 10 throws:	.....	.....	.....	.....

ii) What is the average for your throws for:

a) heads: \_\_\_\_\_

a) tails: \_\_\_\_\_

c) What is the probability that both coins will land heads up if you throw them up at the same time?

---

---

d) A person participating in the Lotto game must take a blue ball out of the container in order to win a prize. If there are 19 pink balls and 2 blue balls in the container, what is the probability that the contestant will win a prize?

---

---

20.4 Work on your own. You will need a di.

a) What is the probability that the 3 will fall on top when you throw the dice?

---

---

b) Now throw the di 15 times. In the space below make a tick (✓) every time the 3 lands on top.

Now write the total number of ticks as a fraction where the denominator is 15.

---

---

Is your answer close to one sixth (use your calculator)

---

Can you explain this?

---

---

---

20.5 Did you know?


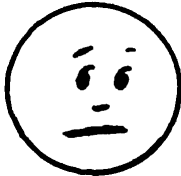

It would be pure chance if you achieved a probability of one sixth in the above activity. Practical probability is based on what you actually did. Theoretical probability is only an attempt to predict what might happen.


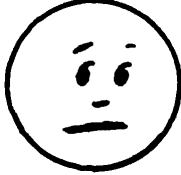


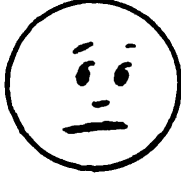


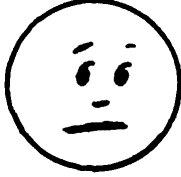


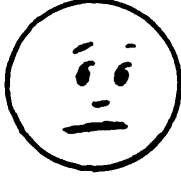

The more times that you throw the di, the closer the practical and theoretical probabilities should come to each other.

20.6 BRAINTEASER

- What is the probability that you will get 7, if you throw two dice at the same time and add the numbers that are showing upwards?

21. Time for self-assessment

<ul style="list-style-type: none"><li>• Colour in the face that is true of you:</li></ul>			
I can explain the concept “probability”.			
I know what a probability of 0 means.			

			
know what a probability of 1 means.			
I know the “formula” to determine probability.			
I was able to correctly calculate the probability in the given questions.			

22. For FUN!

- Use the given co-ordinates and decode the code:

(9,9) (9,2) (1,10) (1,10) (3,2) (1,0) (6,10) (2,6)

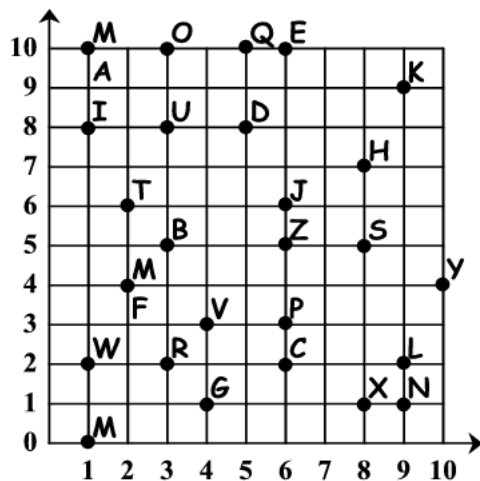
.....

(4,1) (3,2) (1,10) (1,10) (5,8) (8,5) (6,10) (1,2) (6,10)

.....

(8,5) (6,10) (1,2) (1,8) (8,5) (9,9) (3,8) (9,1) (5,8) (6,10)!!

.....!!



## Assessment

**Learning Outcome 5:** The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

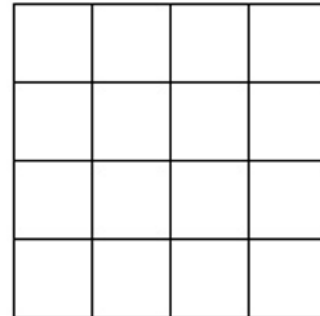
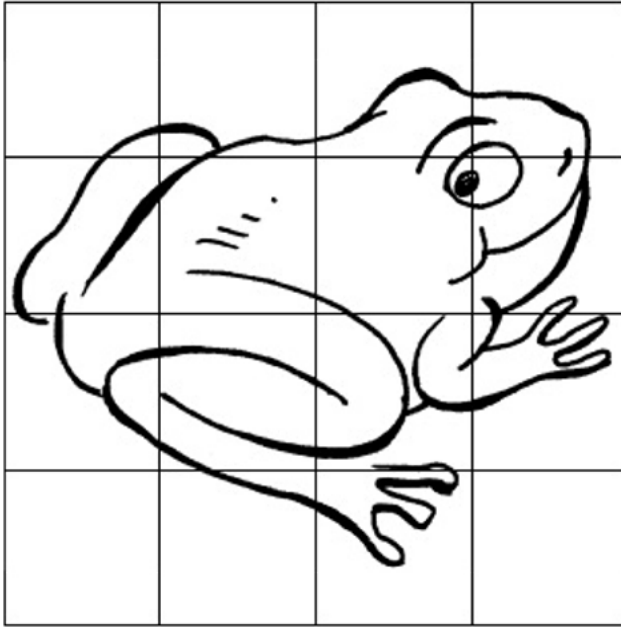
**Assessment Standard 5.9:** We know this when the learner critically reads and interprets data presented in a variety of ways to draw conclusions and make predictions sensitive.

**Assessment Standard 5.10:** We know this when the learner performs simple experiments where the possible outcomes are equally likely.

## MODULE TEST

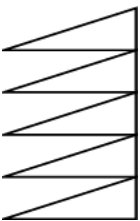
1. Reduce the frog on a scale 2:1.





(3)

2. What kind of transformation was in the following figure?




---

(1)

3. Explain the following concepts:

a) random test:

---



---



---

---

---

(2)

b) probability:

---

---

(2)

4. Look at the following:

A group of learners' marks out of 15 were as follows:

6; 11 ; 12 ; 15 ; 9 ; 10 ; 10 ; 10 ; 8 ; 15

a) Calculate the  
mode: \_\_\_\_\_

---

---

(2)

b) Calculate the median:

---

(2)

c) Calculate the arithmetic mean (average):

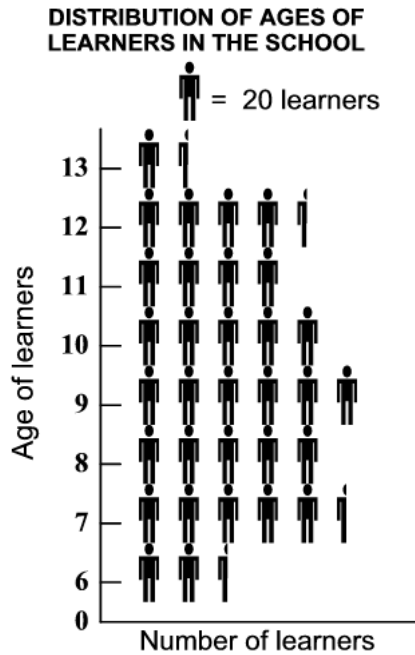
---

---

---

(2)

5. Study the graph and answer the following questions:



a) What is this type of graph called?

---

---

(1)

b) Why does it “jump” from 0 to 6?

---

---

(1)

c) How many learners are 7 years old?

---

---

(1)

d) How many more 9 year old learners are there than 12 year olds?

---

---

(1)

e) How many learners are there in the school?

---

---

(1)

6. Represent the information given in question on a line graph.

(3)

7. What is the probability that you will take a black ball from a container containing 12 red, 6 green, 4 black, 2 yellow and 8 blue balls?

---

---

---

---

---

---

(2)